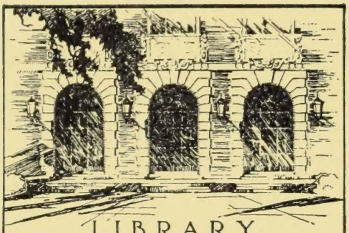


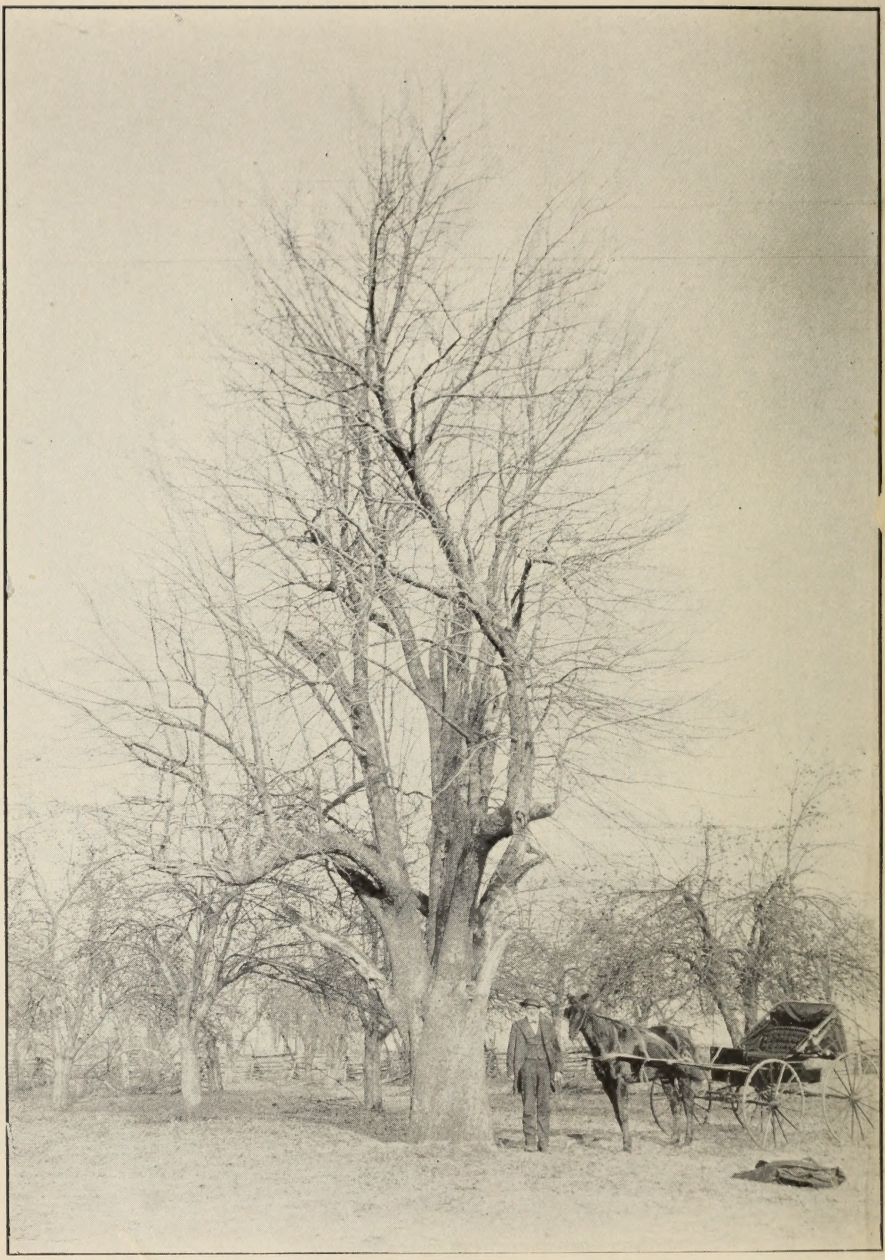
LIBRARY
OF THE
UNIVERSITY
OF ILLINOIS

634.06
IL
v.39
cop.5

NATURAL HISTORY
SURVEY

Digitized by the Internet Archive
in 2016

https://archive.org/details/transactionsofil3918illi



THE ORIGINAL SUDDUTH PEAR TREE, Near Springfield, Ill.
55 feet high, 75 years old, 10½ feet in circumference.

[See Page 145.]

TRANSACTIONS

OF THE

ILLINOIS STATE HORTICULTURAL SOCIETY

FOR THE YEAR 1894,

BEING THE

PROCEEDINGS OF THE THIRTY-NINTH ANNUAL MEETING

HELD AT DIXON, DECEMBER 11, 12 AND 13, 1894.

ALSO PROCEEDINGS OF THE

NORTHERN, CENTRAL AND SOUTHERN DISTRICT SOCIETIES

AND A NUMBER OF COUNTY SOCIETIES.

FOR THE YEARS 1894-'95.

NEW SERIES—VOL. XXVIII.

EDITED BY THE SECRETARY, HENRY M. DUNLAP, SAVOY, ILL.

PUBLISHED BY THE SOCIETY.

THE BLAKELY PRINTING CO.
PRINTERS AND BINDERS
CHICAGO.

634.06
IL
v. 39
Cop. 5

N. H. S.

Report to the Governor.

To His Excellency, Hon. John P. Altgeld,

Governor of Illinois:

In accordance with legal requirements, I have the honor to herewith transmit to you the Twenty-eighth Annual Volume of the Transactions of the Illinois State Horticultural Society, and trust that an inspection of the work of the Society, as shown herein, will satisfy you of the substantial progress made in advancing the horticultural interests of the State, and that the appropriation made by the Legislature has been wisely expended.

The failure of the fruit crop in the State for the past three years has called for careful investigation of the causes thereof, and the earnest efforts of the fruit growers to prevent a repetition of the same. While the fruit grower is to a great extent at the mercy of the elements, he can, by careful study and experiment, seek, by better methods of cultivation, the timely application of insecticides, and a proper selection of varieties that are adapted to his locality, avert disaster and make the annual production of fruit almost a certainty. To the solution of these questions the Executive Board has directed its best endeavors in experiments undertaken in its experiment stations, by directing the work of its members and in securing the aid of the scientific men of the State.

The Board is greatly encouraged and feels confident that a careful perusal of the pages of this volume, and the application of the remedies suggested and principles set forth, will greatly aid the horticulturist in his labors and result in a greatly increased fruit production within the borders of the State.

Five thousand copies of the report have been printed and will be distributed to the farmers and other interested parties.

Hoping that the report will meet with your approval, I remain,

Respectfully yours,

Henry M. Dunlap, *Secretary.*

NATURAL
HISTORY SURVEY
LIBRARY

OFFICERS FOR 1895.

PRESIDENT.....T. E. GOODRICH, Cobden.
VICE-PRESIDENT ....J. L. HARTWELL, Dixon.
SECRETARY.... ....HENRY M. DUNLAP, Savoy.
TREASURER.....ARTHUR BRYANT, Princeton.

EXECUTIVE BOARD.

T. E. GOODRICH. .....PRESIDENT STATE SOCIETY.
HENRY M. DUNLAP.....SECRETARY STATE SOCIETY.
C. C. MILLER.....PRESIDENT NORTHERN SOCIETY.
ARTHUR BRYANT.....VICE-PRESIDENT NORTHERN SOCIETY.
H. AUGUSTINE.....PRESIDENT CENTRAL SOCIETY.
C. G. WINN.....VICE-PRESIDENT CENTRAL SOCIETY.
R. T. FRY.....PRESIDENT SOUTHERN SOCIETY.
JABEZ WEBSTER.....VICE-PRESIDENT SOUTHERN SOCIETY.

AD-INTERIM COMMITTEES.

The President and Secretary of the State Society, and Presidents and Vice-Presidents of the District Societies are instructed to perform this work, or place it in the hands of other competent persons, as the interests of the Society demand.

ANNUAL MEETING FOR 1895

will be held in the city of

KANKAKEE, DECEMBER 10, 11, 12.

CONSTITUTION AND BY-LAWS.

As Amended at the Annual Meeting, 1874.

CONSTITUTION.

I. This Association shall be known as the Illinois State Horticultural Society.

II. Its objects shall be the advancement of the Science of Pomology and the Art of Horticulture.

III. Its members shall consist of Annual Members, paying an annual fee of one dollar; of Life Members, paying a fee of twenty dollars at one time, and of Honorary Members, who shall only be persons of distinguished merit in Horticulture or kindred sciences, who may, by vote, be invited to participate in the privileges of the Society. The wives of members shall be members without fee.

IV. Its officers shall consist of a President, one Vice-President, Secretary and Treasurer, who shall be elected at the annual meeting and serve until their successors are chosen; also an Executive Board, as hereinafter provided.

V. The affairs of the Society shall be managed by an Executive Board, to consist of the President and Secretary of the Society, and President and Vice-President from each of the three District Horticultural Societies of the State.

VI. The Society shall hold annual meetings and publish its transactions annually, *provided* there are sufficient funds in the treasury to defray the expenses of publication.

VII. The Constitution may be amended at any regular meeting by a two-thirds vote of the members present.

BY-LAWS.

I. The President shall preside at all meetings of the Society, call the meetings of the Executive Board, and, under its direction, have a general superintendence of the affairs of the Society and direction of expenditures of money. He shall deliver an annual address upon some subject connected with Horticulture, and shall appoint all special committees unless otherwise ordered.

II. The Vice-President shall preside at the meetings in the absence of the President.

III. The Secretary shall, upon the direction of the Executive Board, conduct the correspondence of the Society, have charge of its books, papers and reports, and prepare its reports for publication, and shall receive for his necessary expenses for

postage, stationery, printing, expressage, office rent and salary, such sums as the Executive Board may vote therefor.

IV. The Treasurer shall receive and keep an accurate account of all moneys belonging to the Society and disburse the same upon the written orders of the President, which he shall retain and file as vouchers; he shall make an annual report to the Society of the receipts and disbursements, which, with the vouchers, shall be referred to a special auditing committee appointed at the annual meeting. Before entering upon his duties he shall give bond to the Society in the sum of five thousand dollars or the faithful performance of his duties, such bond to be approved by the Executive Board.

V. The Executive Board shall perform all the duties required of them by Section 4 of the "Act Reorganizing the State Horticultural Society," approved March 24, 1874. They may appoint such standing and other committees as they may deem advisable.

VI. These By-Laws may be altered at any regular meeting by a two-thirds vote of the members present.

AN ACT TO REORGANIZE THE ILLINOIS STATE HORTICULTURAL SOCIETY.

Be it enacted by the People of the State of Illinois, represented in the General Assembly:

SECTION 1. That the organization heretofore chartered and aided by appropriations under the name of the Illinois State Horticultural Society, is hereby made and declared a public corporation of the State.

SEC. 2. The Illinois State Horticultural Society shall embrace, as hereinafter provided, three horticultural societies, to be organized in the three horticultural districts of the State, which shall be known as the Horticultural Society of Northern Illinois, now operating in the counties of Bureau, Boone, Cook, Carroll, Du Page, De Kalb, Henry, Grundy, Jo Daviess, Kane, Kendall, Kankakee, Lake, Lee, La Salle, McHenry, Ogle, Putnam, Rock Island, Stephenson, Whiteside, Winnebago and Will (23); the Horticultural Society of Central Illinois, operating in the counties of Adams, Brown, Cass, Champaign, Christian, Coles, De Witt, Douglas, Edgar, Fulton, Ford, Iroquois, Hancock, Henderson, Knox, Logan, Livingston, McLean, McDonough, Marshall, Mason, Mercer, Menard, Morgan, Macon, Moultrie, Peoria, Pike, Piatt, Sangamon, Shelby, Schuyler, Scott, Stark, Tazewell, Vermilion, Warren and Woodford (38); and the Horticultural Society of Southern Illinois, operating in the counties of Alexander, Bond, Clark, Clay, Crawford, Calhoun, Cumberland, Clinton, Edwards, Effingham, Fayette, Franklin, Green, Gallatin, Hamilton, Hardin, Jasper, Jefferson, Jersey, Jackson, Johnson, Lawrence, Madison, Macoupin, Marion, Monroe, Montgomery, Massac, Perry, Pope, Pulaski, Richland, Randolph, St. Clair, Saline, Union, Wayne, White, Washington, Williamson and Wabash (41).

SEC. 3. The affairs of the Illinois State Horticultural Society shall be managed by an Executive Board, to consist of the President and Secretary of said Society, and the President and one Vice-President from each of the three District Horticultural

Societies; *provided*, that the eligible officers now elect of the Illinois State and District Horticultural Societies shall be the first members of the Executive Board created by this act, and shall hold their offices until their successors are elected, as hereinafter provided.

SEC. 4. The Executive Board of the Illinois State Horticultural Society shall have the sole care and disposal of all funds that may be apportioned (appropriated) by the State of Illinois to sustain the Illinois State Horticultural Society, and shall expend the same in such manner as in their judgment will best promote the interests of Horticulture and Arboriculture in this State. They shall meet at Springfield on the second Tuesday after the first Monday in January, 1875, and biennally thereafter. They shall render to the Governor of the State a detailed statement of all funds received from the State, and all other sources, which statement shall also include all expenditures made by them, and the specific objects in detail for which said sums were expended. They shall make no appropriation without having funds in hand to meet the same, and if any debt is created the members of the Board shall be held severally and jointly liable for the payment of the same, and in no event shall the State of Illinois be held liable or responsible for any debt, obligation or contract made by the Illinois State Horticultural Society or its Executive Board.

SEC. 5. The Illinois State and the three District Horticultural Societies shall hold annual meetings, at which their officers for the ensuing year shall be elected. Within one month after the annual meeting of the District Societies they shall forward to the Secretary of the Executive Board a report of their transactions, including a list of officers elected at such meeting. The Executive Board shall publish annually, at the expense of said Society, a report of its transactions and such other papers as they may deem of value to Horticulture and Arboriculture. Four members of the Executive Board shall constitute a quorum for the transaction of business.

SEC. 6. Members of the several District Societies shall be entitled to all the privileges of the members of the State Society, except that of voting for officers.

SEC. 7. By-laws and rules that do not conflict with the laws of this State may be passed and enforced by the several Societies herein mentioned.

Approved March 24, 1874.

---

* The Society was first incorporated February 11, 1857—two months after its organization.

LIST OF MEMBERS

OF THE

Illinois State Horticultural Society

HONORARY MEMBERS.

Morrill, R.	Benton Harbor, Mich.	President Michigan Hort. Society.
Kellogg, R. M.	Ionia, Mich.	Pres. Central Mich. Hort. Society.
Guilford, W. H.	Dubuque, Iowa	Delegate Iowa Hort. Society.
Robinett, D. A	Columbia, Mo.	Delegate Missouri Hort. Society.

LIFE MEMBERS.

Dunlap, Henry M.	Orchardist and Farmer	Savoy, Ill.

ANNUAL MEMBERS.

Augustine, H.	Nurseryman	Normal
Andrews, Wm. A.	Fruit Grower and Farmer	Linn.
Bryant, L. R.	Orchard, Cider and Vinegar	Princeton.
Bryant, Arthur	Nurseryman	Princeton
Brewer, G. H.	Farmer	Ashton.
Bell, George	Mfr. Fruit and Vegetable pkgs	Cobden.
Burrill, Prof. T. J.	Dept. of Horticulture, Univ. of Ill.	Champaign.
Barnard, O. W.	Farmer	Manteno
Buffett, Josiah	Small Fruits	Dixon.
Buckman, Benjamin	Fruit Grower	Farmingdale
Brown, Homer D.	Nurseryman	Hamilton.
Baldwin, M. A.	Nursery and Orchards	Jacksonville.
Brown, W. H	Farmer	Canton.
Carpenter, A. N.	Landscape Architect	Galesburg.
Curtis, B. O.	Nurseryman and Fruit Grower	Paris.
Carrilton, Chas	Farmer	Smithboro.
Cooper, Wm.	Farmer and Fruit Grower	Kankakee.
Corbin, Eli	Small Fruits	Carbon Cliff.

Christian, Jacob	Fruit Grower	Mt. Carroll.
Cessna, Rev. O. H	Minister	Dixon.
Cotta, J. V	Nurseryman	Nursery
Cotta, H. R	Small Fruits	Freeport
Dodd, Lemuel	Farmer and Fruit Grower	Morrison.
Decker, Henry	Farmer	Dixon.
Deland, Geo. M	Fruit Grower	Dixon.
Dearborn, J. H	Farmer	Mason City.
Dunlap, H. J	Editor *The Times*	Kankakee.
Doan, H. L	Small Fruits	Jacksonville.
Dunlap, A. J	Farmer	Dunlap.
Dale, Robert M	Fruit Grower and Gardener	Anchor.
Dorsey, Myles	Manager Fruit Farm	Clay City.
Dyer, Wm. S	Farmer and Fruit Grower	Springfield.
Fuller, C	Publisher	Dixon.
Fitch, J. N	Fruit and Vegetable Grower	Cobden.
Foster, Geo. J	Nurseryman	Bloomington.
Fry, R. T	Orchardist	Olney.
Francis, Lucius C	Farmer	Springfield.
Farden, Richard	Contractor and Builder	Peoria.
Friend, J		Nekoma.
Grayson, John C	Farmer	Keensburg.
Groh, Mrs. Emma		Dixon.
Gaw, Thos. W	Cashier Bank	Mattoon.
Geeting, Mrs. C. M		Rock Falls.
Goodrich, T. E	Orchardist	Cobden.
Hartwell, J. L	Small Fruits	Dixon
Hartwell, Mrs. J. L		Dixon.
Hughes, Geo. F	Farmer	Dixon.
Hughes, Mrs. Elwood		Dixon.
Hartman, Moses	Small Fruits	Sterling
Hansen, Henry	Farmer	Franklin Grove
Hammond, Wm	Fruit Grower	Aledo.
Hollister, E. T	Commission Merchant	St. Louis. Mo
Hutchinson, W. E	Nurseryman	Litchfield.
Hammer, John C	Garden and Small Fruits	Moline.
Hammond, M. S	Farmer and Orchardist	Warsaw.
Hollinrake, Geo. S	Fruit Grower	Keithsburg.
Hott, M. T	Commercial Agent	Decatur.
Huff, E. J		Clarksville, Ia
Herrick, Dwight	Potatoes and Small Fruits	Rochelle.
Hubbard, L. G	Farmer and Fruit Grower	Urbana.
Hall, Rev. Claiborne	Minister and Farmer	Athens.
Johnson, F. C	Cider and Vinegar	Kishwaukee.

Judd, W. A.	Farmer.	Dixon.
Joiner, Alvin	Farmer	Polo.
Judd, A. G.	Farmer	Dixon.
Johnson, Jas. T.	Fruit Grower	Warsaw.
Jolly, John F.	Orchardist	Olney.
Jackson, Wm.	Farmer and Fruit Grower	Godfrey.
Kirk, Wm.	Soldiers' Home	Quincy.
Kaiser, Chas.		Centralia.
Kriebel, Daniel S.	Fruit Grower	Springfield.
Kitchen, Wm.	Farmer	Dixon.
Kimmel, W. H.	Farmer	Dixon.
Knapp, Geo. F.	Farmer	Nursery.
Kurth, Henry	Fruit Grower	Centralia
Lord, John L	Farmer	Dixon.
Lloyd, W. B.	Editor	Glen Ellyn.
LaRosh, H. D.	Farmer and Fruit Grower	Pekin.
Moyer, Jno. E.	Small Fruits	Dixon.
Mann. F. I	Farmer and Circuit Clerk	Gilman.
Moore, J. L	Farmer	Polo.
Morrill, R.	Fruit Grower.	Benton Harbor
McCluer, G. W.	Asst. Hort. State Ex. Station	Champaign.
Myers, Geo.	Farmer	Greenwood, Neb.
McGinnis, W. G.	Farmer	Dixon.
Moore, A. F.	Farmer	Polo.
McCune, E. M.	Farmer	Dixon.
Minkler, S. G.	Fruit Grower	Oswego.
Mendenhall, E. G.	Nurseryman and Fruit Grower	Kinmundy.
Mowery, S. W.	Fruit Grower	Mill Creek.
Mitchell, J. W.		Decatur.
McSpadden, J. T.	Nurseryman and Fruit Grower	Neoga.
Miller, Harrison	Fruit Grower and Farmer	Ridgeville.
McWhorter, Tyler	Nurseryman	Aledo.
McNair, John G.	President Orchard Co. 722 Clinton st.,	St. Louis, Mo.
Martin, H. S.	Lawyer and Orchardist	Marion, Kan.
Norris, Jas.	Apiarist and Fruit Grower	Yates City.
Osborn, Jesse W.	Farmer and Fruit Grower	Hillsboro.
Poole, Jacob H.	Farmer and Fruit Grower	Mill Creek.
Patterson, Jas.	Farmer and Dairyman	Stiles, Wis.
Penwell, F. W.	Lawyer and Farmer	Danville.
Pearson, J. M.	Farmer and Fruit Grower	Godfrey.
Perkins, W. H.	Fruit Grower	Quincy.
Powell, C. R	Small Fruits	Sterling
Piper, D. J.	Farmer and Small Fruits	Forreston
Perrine, W. S.	Fruit Grower	Centralia.

Riehl, E. A.	Fruit Grower	Alton.
Robbins, Daniel E.	Farmer and Apiarist	Payson.
Reasoner, Rev. J. R.	Pastor M. E. Church	Fisher.
Reid, Wm.	Farmer	Neoga.
Strubler, Phil.	Small Fruit Plants	Naperville.
Spalding Nursery & Orchard Co.	Nursery and Orchards	Spalding (near Springfield)
Small, Len.	Nurseryman	Kankakee.
Seavy, W. W.		Prairieville.
Soverhill, S. G.	Farmer and Fruit Grower	Tiskilwa.
Shamel, Chas. A.	*O. J. Farmer*	358 Dearborn St., Chicago.
Stone, Jas. A.	Apiarist and Fruit Grower	
Thurston, H. F.	*Farmers' Review*	Winnetka.
Thompson, D. F.	Farmer and Fruit Grower	Kent.
Turley, Elmer.		Mt. Pulaski.
Upton, John.	Farmer and Fruit Grower	Springgeld.
Vandenberg, P. E.	Nurseryman and Small F't Grower.	Jerseyville.
Wood, C. H.	Nurseryman and Fruit Grower.	Ellington.
Weston, Nathan.	Farmer and Small Fruit Grower.	Champaign.
Webster, Jabez.	Nurseryman and Fruit Grower.	Centralia.
Webster, C. H.	Fruit Grower and Nurseryman.	Centralia.
Walker, Simeon.	Farmer and Merchant.	Pyatt.
Woodroffe, Alfred.		Auckland, New Zealand.
Wirt, Geo. S.	Nurseryman	Alpha.
Williams, F. L.	Nurseryman and Fruit Grower.	Tamaroa.
Washburn, Andrew	Small Fruits.	Bloomington.
Warfield, B. C.	Small Fruits.	Sandoval.
Winn, Chas. G.	Orchardist and Farmer.	Griggsville.
Yaggy, L. W.	Fruit Grower.	Lake Forest.
Zook, J. L.	Nurseryman and Orchardist.	Olney.

LIST OF FRUITS RECOMMENDED BY THE SOCIETY.

FOR NORTHERN ILLINOIS.

APPLES—For Market:

Summer—Yellow Transparent, Duchess.
Fall—Maiden's Blush, Wealthy.
Early Winter—Jonathan, Pewaukee.
Late Winter—Ben Davis, Willow, Minkler.

For Family Use, add:

Summer—Benoni.
Fall—Snow, Cayuga Redstreak, Wolf River, Longfield, Ramsdell's Sweet.
Early Winter—Grimes' Golden, Roman Stem.
Late Winter—Salome.

CRAB APPLES—Whitney, Hyslop.
PEARS—Bartlett, Keiffer, Seckel, Flemish Beauty.
PLUMS—Wolf, Lombard, De Soto.
CHERRIES—Early Richmond, Montmorency.
GRAPES—Moore's Early, Worden, Concord, Niagara.
RASPBERRIES—*Red*—Turner, Cuthbert, Shaeffer; *Black*—Ohio, Kansas, Older.
CURRANTS—Red Dutch, Victoria.
GOOSEBERRIES—Downing, Houghton.
BLACKBERRIES—Snyder, Ancient Britian.
STRAWBERRIES—Bubach, Warfield, Crescent; and for fertilizer, Capt. Jack and Dayton (See descriptive list, page 165).

FOR CENTRAL ILLINOIS.

APPLES—For Market:

Summer—Duchess, Red Astrachan, Keswick Codlin.
Fall—Maiden's Blush, Wealthy, Stanard.
Early Winter—Jonathan, Grimes' Golden,
Late Winter—Ben Davis, Willow, Minkler.

For Family Use, add:

Summer—Benoni, Golden Sweet, Sops of Wine.
Fall—Ramsdell's Sweet, Fall Orange, Snow.
Winter—Roman Stem, White Pippin.

PEARS—Howell, Tyson, Duchess, Keiffer, Seckel, Sheldon, Lincoln.
PLUMS—For trial: De Soto, Wolf, Cheeny.
CHERRIES—Early Richmond, English Morello.
BLACKBERRIES—Snyder, Ancient Britian; for late variety, Stone's Hardy.
RASPBERRIES—*Red*—Turner, Cuthbert, Brandywine; *Black*—Gregg, Kansas, Palmer.
For Family and Local Market: Shaeffer's Colossal.
STRAWBERRIES—Crescent, Bubach, Warfield; for fertilizers, Charles Downing, Capt. Jack, Sucker State; for late variety, Gandy.
GRAPES—Moore's Early, Worden, Concord, Niagara, Wilder, Ives,
For Trial: Lindley, Agawam, Pocklington.

REPORT

OF THE

THIRTY-NINTH ANNUAL CONVENTION

OF THE

Illinois State Horticultural Society

HELD AT

DIXON, ILLINOIS, December 11, 12 and 13, 1894.

The Illinois State Horticultural Society was called to order in the court-house at Dixon, Illinois, on Tuesday, December 11, 1894, at 10 o'clock A. M.

President H. Augustine in the chair. Mr. H. J. Dunlap of Kankakee officiating as secretary, in the absence of Mr. Henry M. Dunlap, the regular secretary.

The President called upon Rev. Dr. Sisson, of the Methodist Episcopal church of Dixon, to invoke the divine blessing.

THE PRESIDENT—Instead of having the address of welcome and response now, we will follow the program as it is and have the address later in the morning's session, hoping that the incoming trains will bring more of our friends in. We will now listen to the treasurer's report.

REPORT OF TREASURER.

ARTHUR BRYANT, *Treasurer, Princeton,*
In account with the ILLINOIS STATE HORTICULTURAL SOCIETY.

RECEIPTS.

Dec. 12, 1893	To balance on hand	$2,575 69	
	Order on Treasurer Central Society	133 16	
	Membership Fees	95 00	
Feb. 9, 1894	State Appropriation	2,000 00	
July 5, 1894	State Appropriation	2,000 00	
			$6,803 85

EXPENDITURES.

General Fund	$3,180 07	
Experimental Work	767 60	
		$3,947 67
Dec. 11, 1894	Balance on hand	$2,856 18

EXPENDITURES IN DETAIL—EXPERIMENTAL FUND.

		Warrant.	Amount
Dec. 6	E. A. Riehl, visiting stations	17	$18 30
" 14	E. A. Riehl, stock for stations 8 and 9	18	19 99
" 14	G. W. McCluer, visiting stations 5 and 12	19	16 57
Feb. 7	E. A. Riehl, annual salary and expense bill	20	35 50
" 7	A. Bryant, salary as director	21	25 00
" 7	G. W. McCluer, salary as director and expense bill	22	34 26
" 28	C. H. Webster, station expense No. 7	23	5 25
" 28	T. E. Goodrich, expense station No. 9	24	5 20
Mar. 15	D. L. Bisel, 100 Bisel strawberries	25	5 00
" 15	Geo. Gould & Son, stock furnished	26	2 50
" 26	T. V. Munson, trees and plants	27	2 00
" 26	D. S. Marvin, plants and postage	28	4 70
" 26	N. W. Spencer, blackberry plants	29	5 00
" 26	Elwanger & Barry, trees, etc	30	8 72
" 26	F. S. Phoenix, trees, etc	31	5 55
" 26	Hiram Jaeger, grapevines	32	4 00
April 6	Champaign Co. Printing Co., for printing blanks	33	2 50
" 25	Stark Bros., trees for stations	34	44 10
" 25	John G. Burrow, for grapevines	35	3 00
" 25	Smith & Powell Co., trees for station	36	3 80
May 12	J. G. Carpenter Co., peach trees	37	6 90
" 12	Cleveland Nursery Co., plants for stations	38	14 25
" 12	W. S. Little & Co., trees for stations	39	4 00
" 12	H. M. Engle & Son, chestnut trees	40	3 50
" 12	J. L. Budd, apple and peach trees	41	9 20
" 12	L. E. Vineyard, plants for stations	42	2 00
" 12	G. W. McCluer, express and freight on trees	43	18 25
" 12	W. H. Meeks, for labor, handling stock, etc	44	8 25
" 12	Estate A. C. Hammond, for balance on station work to Jan. 1, 1894	45	31 05

			Warrant.	Amount.
June	9	Gardner & Son, strawberry plants	46	$ 6 00
"	9	W. S. Ross & Son, apple trees	47	91
Sep.	25	H. M. Dunlap, expenses station No. 4	48	54 90
"	25	J. V. Cotta, expenses station No. 2	49	65 00
Dec.	10	J. Webster, station work, No. 8	50	14 00
"	10	C. S. Mace, station expense, No. 11	51	28 55
"	10	M. S. Hammond, station No. 5 expense	52	47 00
"	10	J. S. Browne, expense station No. 7	53	54 30
"	10	C. W. Prescott, expense station No. 3	54	36 60
"	10	A. Bryant, expense station No. 1	55	55 00
"	10	E. A. Riehl, stock bought, visiting stations, etc	56	31 70
"	10	G. W. McCluer, expense visiting stations	57	22 60
		Total		$767 60

GENERAL FUND.

Dec.	14	R. T. Fry, expense board meeting	7	$19 95
"	14	J. Webster, " " "	8	18 08
"	14	A. Bryant, " " "	9	16 13
"	14	E. A. Riehl, fruit exhibit, Springfield	10	10 00
"	14	H. L. Doan, expenses, program	11	4 80
"	14	H. Augustine, expense board meeting	12	8 50
"	14	Jas. T. Johnson, " " "	13	15 61
"	14	O. W. Barnard, " " "	14	7 50
"	14	The Gazette, printing	15	8 30
"	14	Champaign Printing Co., printing programs	16	12 71
"	14	Thos. L. Brunk, program expense	17	13 87
"	14	T. E. Goodrich, program expense	18	13 27
"	14	W. S. Perrine, program expense	19	11 10
"	14	D. J. Black, board of deligates from Mich., Wis. and Ia.	20	11 00
"	14	E. A. Riehl, program expense	21	10 30
"	14	L. R. Bryant, program expense	22	13 05
"	14	G. W. McCluer, program expense	23	5 08
"	14	H. M. Dunlap, expense committee and board meeting	24	14 60
"	14	A. F. Colman, program expense	25	24 50
"	14	C. W. Garfield, program expense	26	25 00
"	14	H. M. Dunlap, incidentals secretary's office	27	34 15
"	14	W. E. Gould, program expense	28	20 48
"	14	J. L. Hartwell, program expense	29	14 82
"	14	A. G. Humphrey, program expense	30	9 65
"	14	J. W. Fitch, program expense	31	16 54
"	14	C. P. Dadant, program expense	32	9 56
"	23	Minnie Walker, reporting meeting	33	25 00
"	23	H. J. Dunlap, reporting meeting	34	25 00
"	25	H. D. Brown, program expense	35	11 05
Jan.	15	H. M. Dunlap, one-half year's salary and reading proof.	36	250 00
"	23	H. M. Dunlap, freight on books	37	28 73
"	27	Eagle Lithograph Co., engraving and printing portrait A. C. Hammond	38	80 00
"	27	Blakely Printing Co., in part for printing transactions	39	700 00
Feb.	7	R. T. Fry, expense board meeting	40	7 00
"	7	A. Bryant, commission as treasurer to Dec. 12, 1893	41	83 11
"	7	H. M. Dunlap, postage, express, etc	42	120 85
"	7	H. J. Dunlap, hotel expenses, reading proof Vol. 27	43	20 00

			Warrant.	Amount
Feb.	7	Jas. T. Johnson, expense board meeting	44	$12 36
"	7	C. G. Winn, expense board meeting	45	4 50
"	7	John Webster, expense board meeting	46	8 85
"	7	O. W. Barnard, expense board meeting	47	11 10
"	7	H. Augustine, expense board meeting	48	7 70
"	7	Arthur Bryant, expense board meeting	49	13 90
"	7	Mrs. A. C. Hammond, office rent and assistant for 1893	50	60 00
"	7	H. M. Dunlap, assistant and office rent July 1 to Dec. 31, 1893	51	40 00
"	7	Jas. T. Johnson, labor, boxes, etc., removing library	52	21 85
"	7	M. S. Hammond, hauling and labor in removing library	53	13 00
"	7	H. M. Dunlap, expenses in placing library	54	10 00
"	9	Champaign Co. Gazette, stationary and printing	55	18 55
"	9	The Blakely Printing Co., balance due on contract	56	816 03
"	28	Eagle Lithographing Co., printing extra inserts	58	15 00
"	28	H. M. Dunlap, freight and drayage on books, postage, etc.	57	19 57
Apr.	6	H. M. Dunlap, postage on World's Fair report	59	50 00
May	29	Wm. M. Deffenbaugh, book case	60	36 00
June	30	H. M. Dunlap, salary one-half year	61	200 00
"	30	H. M. Dunlap, assistant's services, office rent, etc	62	50 00
Aug.	4	Frank Simmons, picture frames for library	63	9 75
Sept.	25	R. T. Fry, expense board meeting	64	6 40
"	25	H. M. Dunlap, expense board meeting	65	4 00
"	25	J. V. Cotta, expense board meeting	66	12 90
"	25	J. W. Webster, expense board meeting	67	9 27
"	25	A. Bryant, expense board meeting	68	9 35
				$3180 07

Mr. Pearson—I move that the report be referred to a Finance Committee which shall be appointed later on. Carried.

REPORT OF THE SECRETARY.

HENRY M. DUNLAP, SAVOY.

The work of the secretary's office increases from year to year as the society extends its usefulness, and the past year has proven no exception to the rule. Over two thousand letters have been written and answered and some two thousand circulars have been sent out in carrying on the work of the society during the year.

ECHOES FROM THE WORLD'S FAIR.

Since the last meeting of the society 4,000 copies of the Report of the World's Fair Horticultural Board have been printed and distributed to the best advantage possible. Many complimentary words have been received at this office from other States and from remote parts of the world, speaking in high terms of the exhibit of fruits which was made at the Fair by the horticulturists of Illinois under the direction of the members of our executive committee. Requests

have been received for the Report from several foreign countries. There is no doubt but what the fruit exhibit made by this State in Horticultural Hall will be of lasting benefit to the horticultural interests of Illinois.

TRANSACTIONS OF THE SOCIETY.

On account of the 1893 volume containing much that related to the World's Fair and other matters of interest, the Board decided to increase the number of copies to 5,000, which is 2,000 more than ever before published. The demand has been such, however, that the Board has decided to print the same number (5,000) this year. It will be noticed that we have members on our list from Iowa, Missouri, Kansas, Indiana and far away New Zealand. Requests for the Reports have come from all the States mentioned and also from Texas, Florida, Oregon, Canada, Dakota and Nebraska. I mention this as showing that the value of our Reports are appreciated away from home as well as by the horticulturists of our own State.

LIFE MEMBERSHIP AND REDUCTION OF THE FEE.

The desire to place the society on a still firmer basis of usefulness has induced the members of the Board to make an effort to place the membership on permanent basis by inducing the fruit growers to become life members instead of transient members. They have therefore recommended to the society a reduction of the life membership fee to $10.00. They have also set apart all the remaining copies of the back Reports of the society to fill out the sets of those who become life members. As the number of Reports of some years is small the Board decided to give them out in the order of the membership. First joined, first served. There is a sufficient number of quite a good many volumes to give every life member his full value for his fee in the back volumes alone, and when the fact that he will receive the reports of the society as long as he lives without additional cost is considered, it would seem that all our members should become life members. Personally I am not sure but what the life membership would be doubled by placing the fee at the nominal figure of $5.00. This is one of the questions for this society to settle, as it involves an amendment to the constitution.

A PERMANENT MEETING PLACE.

The theory on which our society is organized would permit of the selection of a permanent meeting point for the State society at the Capitol, leaving the three district societies to do the necessary missionary work in the several districts, which partakes very much of the primary work of the horticulturist involved in the experience of the beginner, and which has of necessity been done at every meet-

ing of the State society, and which will have to be continued so long as the society continues to move about from year to year and to take up the work which should be left to the district societies. It seems to me that the proper function of the State society should be to take up the higher questions of Horticulture of perhaps a more scientific character and of a higher order—high school department of the horticultural field, if you please—while the district societies occupy that of the primary and intermediate departments of Horticulture. We have, through the efforts of the Board, secured since the last meeting a recognition of the society at the State Capitol, in having a room set apart for the meetings of the Board and for their library and a storeroom for the surplus volumes. This gives the members a home at the state house, and perhaps it will be well to follow this up as many State societies are doing in other states, by making a permanent home at the State Capitol.

Railroad courtesies have been received from the Illinois Central to a generous degree, which greatly facilitates the work of the Board at a minimum expense.

The expenses of the society for the year ending December 10, 1894, may be summarized as follows:

Experiment station expenses	$ 767.60
Expense of publishing Vol. 27, 5,000 copies	1,611.03
Commission paid treasurer for year ending Dec. 1, '93	83.11
Program expenses of annual meeting, 1893	214.07
Expense of fruit exhibit, annual meeting, 1893	28.85
Meetings of the Executive Board during year	204.80
Special committee expenses	34.60
Printing, stationery, programs and circulars	39.56
Telegrams and sundry expenses	8.61
Reporting proceedings, reading proof, and extra office help	150.00
Express and freight on books, etc.	31.24
Expenses of transferring library from Warsaw to Springfield and fitting up room	119.33
Postage on World's Fair Reports	50.00
Postage on letters, programs and on Vol. 27	104.87
Salary of the secretary	400.00
Office rent, fuel, lights, etc.	40.00
Balance paid estate of A. C. Hammond	60.00
Total expense of the year	$ 3,947.67

The President—You have heard the report. What will you do with it? There are some very important suggestions made by the secretary. I refer especially to that of life membership and a permanent

location for our meeting in the future. These are things that ought to be brought up. Will you refer it to the same committee?

MR. PEARSON—I move you, that so much of the report as relates to financial questions be referred to the same committee which handles the treasurer's report, or to a committee on finance; and the other matters, including life membership and a permanent location for the society, be referred to a special committee. The motion prevailed.

THE PRESIDENT—The Hon. J. F. Palmer, mayor of Dixon, will give us the address of welcome. We would say to the honorable Mayor, we are sorry we have not a larger attendance; but can assure him that the quality of his audience is first-class.

Hon. J. F. Palmer, being introduced spoke as follows:

ADDRESS OF WELCOME.

Mr. President and Members of the Illinois State Horticultural Society:

I had expected to greet a larger audience than is present this morning, hence I shall cut short what I might have said. I shall presume, however, that the reason why the audience is so small is because I was not expected to speak. The presumption of the law is always in favor of the victim.

I am glad, gentlemen of the Illinois State Horticultural Society, to be present this morning, notwithstanding the inclemency of the weather, and express to you a few words of greeting and congratulation. On behalf of this city, I would extend to you a hearty welcome to our city. You are welcome because we are always glad and happy to have such men as you among us—we welcome you as we always do culture, literature and art. Our people are amply qualified to appreciate your endeavors and your attainments. The members of the Illinois State Horticultural Society have for many years devoted much time and intelligent labor in promoting the best interests of the State, and your society creditably represents one of the most important industries of the State, and deserves greater commendation than I am able to bestow. If the attendance is not as large in this convention as is desired, it will be due in a great measure to the number of changes at this season of the year.

I would congratulate the people of Dixon and the vicinity, if they were here, in having the opportunity to attend these lectures.

It is one of the great advantages of living at the top—of living in our country. No nation on earth has so many homes distributed among the masses of the people as the United States. That is the

beauty of our nation; that is the strength of our nation. Mr. Blackstone, in his treaty on real estate law, has said there is nothing that so generally strikes the imagination and engages the hearts of people as the right of property, or that sole and absolute dominion which one man claims and exercises in total exclusion of the right of any other individual of the universe. No State in the Union has so many laws securing this right of men and women as the State of Illinois. There is no place on earth so sacred, and that comes nearer and dearer to one's heart, than comes the ground they call home; and yet, how few of us make the most of it, if the way is made plain for us.

The culture of plants and flowers, the growth and treatment of fruit trees and shrubs, and vines, as I understand, is the art that Horticulture teaches, but not this alone. How little most of us know about this important art. Our homes are substantially made and many of them are architecturally beautiful, but they lack much of that intelligent care and beautiful surrounding that comes of Horticulture. They are decidedly lacking in much that renders them pleasant. An eastern husbandman once remarked in reference to our farms: "Your homes look well at a distance, but on near approach there is something lacking. Plants and flowers are too generally missing." There is, gentlemen, too much truth in this statement. Now, gentlemen of the Illinois State Horticultural Society, we hope that the words you will utter here, and the seeds you will sow, will give us a higher and broader conception of what constitutes a home in the best sense, and give us here in northern Illinois an impetus that will enable us to accomplish great results. May it be a green spot in your recollection as well as in ours, one that you will be pleased to recall.

Hon. J. M. Pearson of Godfrey, Ill., being called upon by the Chair, responded, as follows:

Mr. President and Gentlemen of the Illinois State Horticultural Society:

We are truly glad that we have been able to be here and listen to the kind words with which the honorable Mayor has been pleased to greet us this morning. When we remember the little that we have been able to do in past years in our own portion of the State, we were quite in doubt as to whether anybody would be glad to see us. We have not got anything to show for it and supposed that our friends could hardly feel like thinking we had done anything, and therefore, we do not feel like we ought to say anything. I am reminded of a saying of old Governor Geary of Massachusetts, who was somewhat infected with the French ideas of those times. He

had to issue a proclamation for Thanksgiving, and so, after enumerating some things that had not been done, he went on to say that it was customary among his predecessors to give thanks for the success that had attended the fisheries, "but, really there was so little of it done this year that it hardly seemed to be worth while." Ask some of the people down in our part of the country what they have done, and it does not seem as if they had done much of anything. We recognize that as a class; and I think I am safe in saying it, that as a class horticultural people recognize the truth of what was so beautifully said to us this morning about a closer dependence upon a greater power than ours. Of course, we believe it rules everything, but no class of men are so absolutely dependent upon wind, rain and sun as we horticulturists. We cannot control them, as we have not yet invented a machine to do it, and we realize it almost every day of the world—our close dependence upon a power outside of our own. It ought to make us modest—I wish I could say it did.

We realize, too, that Horticulture as an art or as a profession is valuable in building up the homes and making them picturesque, as was so beautifully referred to in the address just given to us. But we people of Illinois are too apt to be careless about it, to consider a home as a good place to be born in but not good for much else afterward. We go away somewhere else, and our children go away somewhere else. We don't appreciate those pleasures that are so close to us. Indeed, I have not been able to make a home for my children to stay in. They get married, just as I did; and just as a man thinks he has raised a family of children to be in his home, they go off to Chicago.

But, Mr. President, I want the people of this community to understand that this society has not outlived its usefulness, and so long as it is a society and we have fruit that we can put by the side of other States, and we find it is profitable to produce it and replenish it, we have got something to do. We are on the way of discovering new varieties. We will say there are few new varieties. But most of us think there is nothing like the Ben Davis. Some fellow will come along and tell you that he has a good apple, that he knows all about it, that it is a fine apple and it will give you good returns and pay better than anything else; but we may stick to the Ben Davis from now until doomsday, until "the sun grows old and the stars are cold, and the leaves of the judgment book unfold," and we will never make good apples. We want an apple that will be just as good in southern Illinois (for it takes a good apple to be good down there), but we want an apple that will be so good down there that we can afford to raise it, and you people will want it, and when it gets there we will all know it. And until we know the best apples, and cherries and peaches, our work is not done.

THE PRESIDENT—The appointment of committees is next in order. There are several other committees besides the two already named, that we shall have to appoint. There is the committee on obituary and the committee on final resolutions. How will you appoint these committees?

The motion was made, seconded and carried that these committees be appointed by the Chair.

MR. DUNLAP—I have here a letter which asks for the appointment of a delegate from our society to attend the meeting of the American Pomological Society, to be held in California January 9, 10 and 11, and as Dr. Small is in California already, and would be very much pleased to attend the meeting, I think it will be well to have him appointed and give him some credentials from the society.

MR. RIEHL—I think it is right and proper that a matter of such great importance as this should be referred to the Executive Board for their action, inasmuch as the Board has appointed all the other delegates to conventions, I think it is the best that they still keep that before the Board.

On motion, the matter was referred to the Executive Board.

The Secretary then read the following communication from the National League of Commission Merchants:

CHICAGO, ILL., December 10, 1894.

H. M. DUNLAP, Secretary,
Nachusa House, Dixon, Ill.

Dear Sir:—The National League of Commission Merchants will hold their third annual session at the Astor House, New York city, January 9 to 11 inclusive.

I desire through you to extend a cordial invitation to the members of the Illinois State Horticultural Society to be present at that meeting, as the topics for discussion, and the general work will be in the line of bettering the condition of the shipper, as well as interests of the commission merchant.

It would afford us great pleasure to meet your representative men on that occasion.

Very truly yours,
G. W. BARNETT, President.

On motion, the communication was referred to the Executive Board.

MR. R. MORRILL, of Lowell, Mich—As invitations seem to be in order, allow me, in the name of the Michigan Horticultural Society, to request you to send a delegate to our next meeting at Lowell, Mich.

MR. SMALL—I move that Mr. Morrill's invitation be accepted and the appointment of a delegate be referred to the Executive Board. Motion carried.

THE PRESIDENT—I will name a finance committee and committee on obituary. We have lost one of our oldest members from the northern part of our State. He died recently; Elmer Baldwin, 87 years old, who was prominent in the work and in the horticultural interests; we appoint as committee E. A. Riehl, Len. Small and Arthur Bryant.

We appoint as a finance committee, L. R. Bryant, F. I. Mann and W. S. Perrine.

THE PRESIDENT—You will notice the question box. My experience has been in meetings, that many persons come and attend them all through, and that there are a great many questions that are of vital interest to them, that are not touched upon at all in the meetings. These questions may be of especial interest to some attending the meetings, and, in order to draw these things out, it was suggested that we have a question box opened at every session (I believe at every session) and if any of you have in mind any question, just write it out, and if you have anyone you think especially capable of answering it, hand it in, mentioning the name of the person you desire to answer it, and we will call on that particular person to answer the question. It was thought that in this way we could get more practical information than in any other. Now do not be afraid to ask these questions and indicate, if you wish, who is to answer them; if not, the Secretary or Chairman will request some one to answer the question. Is there anything you have in mind now that you want to bring up?

MR. SMALL—I would say while our Treasurer is in place, it might be well to give an invitation to the parties present, who have not paid their membership fees, to hand them in.

THE PRESIDENT—The Treasurer will register the names of all persons who will pay $1.00; that will entitle the person to two volumes or the Annual Report of these proceedings.

THE SECRETARY—There is another thing which is of interest to all the members; that is, in reference to the return railroad rates. We have an arrangement with the Central Traffic Association whereby all persons attending will have a rebate on the regular fare, if one hundred certificates can be produced, showing that as many as one hun-

dred persons attended the convention. All persons holding railroad certificates please hand them in to the Secretary.

THE PRESIDENT—If there is no other business before the convention, we will adjourn until 1:30 this afternoon.

MR. PEARSON—I understood you were to appoint some committees. I think that if we adjourn right now, the committees ought to be appointed before adjourning, as it would be no more than fair to give these members that time in which to do that work. If you take these members out of the meeting it will diminish our session, and I hope the committee will do the work during the noon hour.

THE PRESIDENT—For this afternoon there are but two committees appointed and one of them is not required to report before the close of the session, and we will consider the question of a longer noon hour later on, but unless there is a motion to put off the coming together until a later hour, we will convene at 1:30.

MR. MCCLUER—It seems that if the special committees are to be appointed, the sooner they are appointed the better. Of course it is immaterial about the finance committee, but the committee on life membership it seems, ought to be appointed, and if that is to take effect, it ought to begin now and have it start with this meeting, rather than have it for a later arrangement, and I see no reason why the committee cannot report this afternoon.

THE PRESIDENT—That committee has not yet been appointed. The number is so small I hope there will be a larger attendance later in the day, but if you insist I will appoint the committee now.

MR. PEARSON—It seems important that some of these committees should be appointed as soon as possible. I want to hear a report from the committee on the Secretary's and Treasurer's reports before I vote on a secretary and treasurer for next year. They are the first things to come up and I want to hear what was done about life membership sometime before I get home and have to wait to look in the volume for it along about next March.

THE PRESIDENT—I will appoint as a committee on life membership, G. W. McCluer of Champaign, T. E. Goodrich of Cobden, and J. M. Pearson of Godfrey. The committee on final resolutions is still to be appointed, but if there are no objections I will appoint that at a later hour.

At this point the session was adjourned until 1:30 P. M. of the same day.

AFTERNOON SESSION.

TUESDAY, DECEMBER 11, CONVENED AT 1:45 P. M.

THE PRESIDENT—Before proceeding with program I will announce the committee on final resolutions, which is as follows: R. N. McCauley, J. V. Cotta and G. W. Foster.

On motion of Mr. Small the Chair appointed G. W. McCluer, E. A. Riehl and T. E. Goodrich a committee to examine the horticultural implements on exhibition.

HORTICULTURE AT OUR FAIRS.

LEN. SMALL, KANKAKEE.

Mr. President:

For me to attempt to instruct you on this subject would be like a child, just learning how to walk, trying to give instructions on the best methods of walking. It is true that since I was a little boy nine years old, and exhibited three big yellow pumpkins at our old fashioned county fair, that I have never missed attending the regular annual reunion of our fair from that day to this, and that I have had considerable to do with its management, having held nearly all of the official positions in the association, from awarding committee up to president and down again. But outside of this little old-fashioned county fair my experience has been very limited. And were it not for the fact that I wish light on this subject myself, and hope that some of you here, who have had so much experience, some of you who have worked and planned months for that great modern fair of all fairs, the Columbian Exposition, may be induced, by something I may say, or fail to say, to throw out some hints, I would not attempt to even partly fill my place on this program.

Our fairs are created for the purpose of improving and advancing agriculture. Horticulture in connection with fairs is usually understood to mean fruits and flowers, and is a very important part of agriculture. Fruits and flowers are generally placed in one class or division under one superintendent, as at our State fair, but they are very distinct; there is as much difference between floriculture and pomology as between beef cattle and dairying, or horses and cattle, and I think they are of enough importance to be divided into two classes with a superintendent for each, one to be known as Pomology and the other as Floriculture. In the case of our State fair, I have made these suggestions to President Judy and some other members of

the Board, and think it probable that the division will be made. There may be more dollars' worth of grain raised in Illinois than of fruits; but fruits have a value that cannot be measured by money.

To make our exhibits of horticultural products a success we must interest the people. You all know what Barnum said about people wanting to be humbugged; now that is not literally true, but this is an age of progress and the American people of all others want something new. How long would a fair or any other kind of an exhibition be financially successful if the people who pay their money to attend did not expect to see something new; at least new to them, and let me say right here that for a fair, or most anything else on this earth, to be termed a success it must be a financial success. The almighty dollar may have been the cause of a great deal of wickedness, but most of us have not only been taught, but compelled to respect its power, and it is a great deal easier to accomplish good with its aid than without it. Therefore I consider it one of the essentials to successful fair management to so conduct the exhibition, as a whole, as to make it pay; always of course keeping in mind the object of an agricultural fair.

This something new in the horticultural departments, may be the arrangement of the exhibit, or it may be in the extent and quality of the exhibit. It might be that something could be done to enlighten the general public on the hygienic effects of fruits as a diet as compared with meat or other foods, and there is vast need of such instruction. It might injure the doctors' business, if we, as a people, ate more fruits and less pork we would be far healthier and happier. My little family at home would no more think of dining without fruit than without bread, and doctor bills so far have been a thing unknown. One of our most intelligent and successful farmers said at a recent local horticultural meeting that he would as soon try to raise pigs without milk as children without apples. I tell you, fellow horticulturists, that fruits are necessary to the health and happiness of our people, and only a small part of them fully realize it.

The list of premiums, which should be as liberal as possible, should be so offered as to bring out some exhibit from every part of the district. For instance in our State every county can grow some kinds of fruit worthy of exhibition and the list should be so arranged that there would not only be a place for it but a fair prospect for some products of each county receiving recognition.

This society, the object of which our constitution says "shall be the advancement of the science of pomology and the art of Horticulture," holds a position in which it can do a great work and assist greatly the fruit and flower displays at our State and county fairs.

DISCUSSION.

THE PRESIDENT—The paper just read by Mr. Small, of Kankakee, is open for discussion.

MR. BARNARD—I wish to say a word with regard to it. The motto of that essay is *Multum in parvo.* He has gone almost to the other extreme of making it a little too short, being so full of meat. But there is a whole sermon in every sentence, and I don't think we can commend the points made in that essay too highly, especially on the score of health and happiness that are the result of a fruit diet. It is not that I should discard meat but should favor using more fruit and less flesh.

MR. MORRILL—I think that Mr. Small's paper touches a very important matter. I don't know whether we all realize fully the disadvantage of improper classification of fruit, which we have been subjected to at our fairs. Somebody usually has control of the classification who has but little or no practical knowledge of the requirements of the position. The mistake is made of trying to put floriculture and horticulture, or pomology, together. This is not correct. We are rapidly becoming a nation of specialists, and you have men who are more familiar with apples than with anything else. Now we should pay attention to the fruits; but the man who pays strict attention to fruits is not competent to take charge of the floral exhibit. It is not possible, and still, as the gentleman says, they are generally crowded together under one management, and that is generally a mismanagement. You take the World's Fair, and the original classification in Horticulture was one of the worst messes we have ever seen. I think you will agree with me on that. In many instances the fruits are very badly classified in these local exhibits, and there should be some new system of classification. An expert man should be hired who could classify his own department, or the one he was familiar with, and not be compelled to clasify the others. The trouble is, this thing generally goes by favoritism. Favoritism has crept into our fairs and other exhibits, and we should be glad to have this looked into.

MR. MOORE—John Ure, the florist, has been added to the Board of Agriculture; I don't know how he will be assigned but I presume to that department, and when we want a classification of fruit, if it is sent to him before the second week in January---the Board meets there

the second week in January—we can have it just our own way. It is the first time that a practical horticulturist has been a member of that board for a good many years.

Mr. Small—I never knew a good florist to make a good superintendent of fruits; as a rule florists don't know anything about fruit, and a fruit man is not very competent to be a superintendent of flowers. Our classifications are certainly not right.

Mr. Goodrich—I like the point brought out by Mr. Morrill—the lack of horticultural knowledge exhibited by the men who got up the Columbian Exposition. They knew all about something else but absolutely nothing at all about our business. You all remember the earnest solicitude with which we tried to have some of their mistakes corrected, and the earnest effort we made, joined with other delegates, to correct their mistakes; but you know how we were handicapped. It is this lack of knowledge on the part of the men who have these things in charge, and it reaches down to all our fairs, our state and county, and district fairs. In Union county, growing fruit is one of the principal industries we have. We have two fairs, and yet of all things exhibited there, fruit is the least important. It does not go on the tables properly and the men who decide where the premiums shall go are not always fruit men. Sometimes it goes by personal favor. With other things it is different. Now when we have a poultry show, they get three preachers to decide the premiums because they have consumed a good many chickens and are the best judges. But the fruit men seem to get a man who knows least about it. And I have long since ceased to exhibit at the fairs, because in such a way my reputation as a fruit grower would be so hurt that I could not do anything.

Mr Morrill—I would carry my ideas a little further. I would carry it to the judges, but principally to the matter of classification. There is where the matter is to be righted. It is usually done by executive board or society. I believe they attempt to appoint a superintendent who knows something about it, but so many things are bunched together it destroys whatever he might do. His intelligence will be displayed in the department he knows, and the others will be a rank failure. My opinion is the expert judge system is the best. As a rule, our judges are selected from among men who are our acquaint-

ances, and it is generally three good men, but who are neighbors of the men who are exhibiting, and are a little partial or are perhaps inclined to favor, and I don't think you can get the best judgment. I have seen the best results from a selection of single expert judge whose judgment is not questioned, perhaps a foreigner to that locality. Get such a man and he will decide without favor, because he knows nothing of those people and he is paid for his time, and I have no doubt in this way the best practical results would be obtained.

Mr. Powell—I had a little experience this fall about entering. They are getting pretty shrewd and the examining committees are generally ignorant about the varieties of fruit, and don't know the same fruit if they see it exhibited at two different times, or in two places. One man could enter twenty or thirty varieties and probably wont have over fifteen. That I am aware of, as I was one of the judges and know it to be the case. I happened to know the varieties and we made quite a different kind of disposition of the premiums from what they expected.

PRIZE ESSAYS.

The President—Those who have examined the program will notice there has been a prize offered for the best essay on "The best methods of planting and growing an apple orchard." There were two prizes offered. There were some twenty or more essays handed in; the names were not given, but the essays were numbered and so handed to the committee. The committee was entirely ignorant of who wrote each essay. We will have the secretary now read the essay which has been awarded the first prize.

Mr. Mann—Mr. President, on behalf of the committee, and as the Chairman has suggested, I would state that when we examined those essays we did not know who wrote them, and had no means of detecting the individuality of the essay. While some of them were in handwriting, none of us could recognize it. In awarding the prizes, we took into consideration the question of the ground covered by the essay, and also the quality of the ground covered by the essay—so to speak—and I think in this there is nothing but what the society will recommend.

The secretary then read the

FIRST PRIZE ESSAY.

THE BEST METHODS OF PLANTING AND GROWING AN APPLE ORCHARD IN ILLINOIS.

HENRY M. DUNLAP, SAVOY.

Mr. President:

The growing of an apple orchard is a matter of very great importance, from the fact that several years of time are consumed in its growth before fruitage. Satisfactory results will depend very largely upon the judgment and care displayed in each step of the process from the selection of varieties to the after cultivation. If rightly done the benefits will continue for a generation, but if poor judgment is exercised in the selection of varieties accompanied by a lack of care, the planting of an orchard is likely to prove an annoyance and a failure. The knowledge required is, however, so simple that it might well be expressed in four words, viz., "good varieties" and "thorough cultivation." Some of the necessary details we will endeavor to give in as practical a form as possible in the following pages:

IN SELECTING A SITE

for an orchard on the prairies of central and northern Illinois there is little opportunity for choice except that the land that will grow the best corn crops is likely to produce the healthiest trees and the best fruit, due in a large degree to its ability to resist drouth during the summer months. In the hilly sections of the State orchards planted on a northern exposure are considered to have the most desirable location. For an orchard planted for family use it is always best to have it near the dwelling, for convenience in gathering the fruit during the summer and fall. For the winter varieties it would not matter. When the surroundings will permit, the orchard should be located to the north and west of the farm buildings that the trees may serve as a protection from high winds during the winter.

THE PREPARATION OF THE SOIL

should be commenced the autumn previous to setting the trees; the planting being most safely done in the north half of the State during the spring. The soil should be well plowed to a good depth where the orchard is to stand. Before planting, the land should be carefully staked or marked off both ways and stakes set, or marks made where the trees are to be set.

DISTANCE AT WHICH TO SET TREES.

If you want the best results, in the long run, and the healthiest trees, you should set the trees at distances of not less than 30 x 30 feet. This will give you fifty trees to the acre and will insure sufficient room for them to reach the greatest perfection of growth and to mature the fruit in the greatest amount and most perfect condition. At this distance apart the trees will not interfere with each other and there will be room for proper cultivation during the lifetime of the orchard. It is true that some upright growers might be set a little closer than the distance above mentioned but there are other varieties, with spreading branches, that really will have too little room. In setting a commercial orchard I have overcome this to some extent by alternating the two, as for instance the Ben Davis with the Minkler.

There is certainly no economy in too close planting, for many orchards are practically ruined by this mistake. The error of too close planting is not confined to the farmers' orchard, but the commercial orchardist sometimes suffers from the same delusion, with the mistaken idea that he will cut out the extra trees before they damage each other and thereby be ahead several crops of fruit. Don't be guilty of such folly, for there is an old saying that "history repeats itself," and a very true one in this application, for I think I am safe in saying that there is no case on record in either sacred, profane or horticultural history where a promise, to cut out the extra trees, has been kept in time to prevent serious injury to the orchard. If, however, a record had been kept of the many failures to cut out the trees in time and of the thoughts of the owner afterward, many pages might have easily been added to "profane" history. As to the style of planting I much prefer the *square* to the *qnincunx* system, it being more convenient for cross cultivation.

SETTING THE TREE

is important, as there is a right and a wrong way to do this as in every thing else. The wrong way is to dig a hole in blue grass sod much smaller than the roots, shove them into the hole and when the latter proves to be too small jump on the roots with both feet and jam them into it, turning the sod bottom upward on the roots. This may be an extreme case but it is sometimes done by those who ought to know better.

The right way is just the opposite of this. After the ground has been plowed the previous autumn, and the land properly staked off, the holes should be dug large enough to freely admit the roots and to a depth sufficient to plant the tree two inches deeper than it

stood in the nursery. Place the tree in the hole, with the side having the greater number of branches to the southwest and slightly inclined toward the two o'clock sun. Sift the fine dirt over the roots and at the same time gently agitate the tree up and down that the dirt may be worked in among them. When the roots are covered to a depth of two or three inches step down into the hole and firm the dirt with the feet from that time until the hole is filled to within an inch of the top, when the firmed earth should be covered with an inch or so of fine loose soil to prevent evaporation.

If the soil is *very* dry, water should be poured into the hole after the roots have been covered two or three inches with fine soil, then after adding more soil the dirt may be firmed as before stated. This is seldom necessary in spring setting, except in very late planting. As a usual thing it is not necessary to use water except for the purpose of puddling the roots before planting, which should always be done. A half barrel partly filled with water with enough loam soil in it to make it thick is a good puddle, or a hole can be dug in the ground and filled with water for the same purpose. This should be done immediately before planting and not allowed to become dry on the roots before covering.

The object of inclining the trees to the southwest is that, the prevailing winds being from that direction, the tree would if, set strictly upright, in time lean to the northeast and be liable to sunscald and invite attacks from the flat-headed borer.

THE SUBJECT OF PRUNING

is one intimately connected with the planting of a tree, for whatever pruning is necessary should be done at the time of setting the tree and all after pruning should be supplementary to that. It is presumed that you have purchased well-grown and healthy trees with well-branched heads. A tree with a main leader or stem running through the center with a sufficient number of branches diverging from it equally in all directions, leaving the main leader at intervals of from three to six inches, is the model tree, and such a tree needs no pruning. Such a tree when grown will seldom split down or decay at the intersection of the branches with the trunk. It is not often that a strictly perfect tree comes to us from the nursery, for they are hard to grow, and it becomes necessary to bring the tree into this model condition with the pruning shears by removing some of the branches where they are too close together, keeping the tree as nearly balanced on all sides as possible. Should the tree, after getting it as nearly in shape as may be, have more branches on one side than another, the tree should be planted with the excess of branches to the southwest. I would avoid cutting

back the ends of the laterals except it be to bring in some unusually long one. I have trees in a commercial orchard of three years planting that have been pruned in three different ways, one as above stated; another where all the laterals are cut back and the leader left uncut, and still a third lot in which all the branches, including the leader, were cut off at planting. Of the three methods the one here recommended has proven by far the most satisfactory as making the best trees. If the tree has been pruned, as above indicated, at the time it was planted all that is necessary to do afterward is to cut or rub off all sprouts in June and September. And as it is necessary to examine the trees during these months for the borers, but little extra labor will be necessary to attend to the pruning at the same time.

TOP WORKING

some of the medium hardy varieties, such as the Maiden's Blush and Keswick Codlin, will no doubt increase their hardiness for the northern portions of the State, if done on congenial, hardy stock that they will not overgrow.

LOW HEADED TREES THE BEST.

Much has been written upon this subject, but from observation and personal experience I am very much in favor of moderately low-headed trees for the following reasons: The trees are less liable to suffer from high winds; the ground is better shaded and evaporation after summer rains is thereby retarded; for the same reason the grass is kept down; the trunks of the trees are better protected by the branches from the too affectionate rays of the sun, thus preventing sun-scald; the fruit is much more easily and economically gathered from the tree. The only argument in favor of high-headed trees is that they are more easily cultivated, but if planted far enough apart, that the branches do not interfere when the trees are twenty years old, there will be all the room necessary for cultivation with low-headed trees.

VARIETIES.

Too much importance cannot be attached to this branch of the subject, the selection of varieties adapted to the locality and to the purpose they are intended to conserve. Nothing that can be done in the way of after cultivation and care can atone for the selection of poor varieties when once set, for you not only lose the price of the tree, but, what is of far greater consequence, the time and labor spent in growing it. Time is lost which cannot be replaced and the only remedy is to go back to the beginning and plant new varieties

For a commercial orchard plant such varieties as are profitable in your locality, consulting the lists recommended by the State Horticultural Society and the orchards of your vicinity, avoiding all novelties and untried varieties no matter how highly they are recommended. In selecting varieties for a commercial orchard the location as to market should be considered, but as a general rule the very early summer and the winter varieties pay best.

For an orchard for family use I would plant 100 trees, divided into twenty for summer, twenty for fall and sixty for winter. I would plant but two to four trees each of the summer and fall varieties, and be careful to select those which will give a succession of fruit. In making up a list for winter I should not exceed five varieties, planting the largest number of trees of the long keepers, taking into consideration their other qualities also.

CULTIVATION.

After giving careful consideration to the selection of varieties, pruning and planting, we come to the very important matter of cultivation.

For a family orchard, during the first few years vegetables, small fruits and sweet corn can be grown without detriment to the trees if careful culture is given. If trees have been set at a distance of thirty by thirty feet small fruits may be continued in the orchard until it has attained an age of ten or twelve years, with careful cultivation to keep out the weeds and grass, with enough barnyard manure added from time to time to keep up the fertility of the soil. After this time the land may be seeded to clover for two or three years and then plowed up and cultivated without crop for a couple of years, and then seeded down again, and so on alternately.

For a commercial orchard there is no better crop on a large scale for the first few years than corn. After setting the trees the land should be put in thorough order and the corn planted so that it can be cultivated crosswise, which will save a great deal of hand labor. This is much to be preferred to drill planting. Trees can be planted to corn for three or four years, then seeded to clover for a couple of years; then again in corn for two years, and then to clover, alternating with corn until the orchard is ten or twelve years of age, when the corn crop should be omitted and clover alternated with clean cultivation with the plow and harrow. As the trees get large it will be necessary to plant a less and less number of rows of corn, but cross cultivation should be continued as long as corn is planted. The disk harrow is a very economical implement to keep the land in good cultivation when the orchard gets so old that corn is no longer planted.

A harness known as the Sherwood harness, which does away altogether with double-trees and single-trees, will be found of great value in plowing and cultivating an orchard, as the team is attached directly to the end of the plowbeam, with a chain between the horses similar to the old ox team harness. Such a harness costs about eight dollars and is very useful.

THE USE OF FERTILIZERS

in an orchard when it has arrived at bearing age is to be highly commended. For the large orchardist clover is by far the best and cheapest, but in a small orchard, such as should be on every farm, no better fertilizer need be desired than well-rotted barnyard manure.

For renewing an old orchard plow up your bluegrass sod in the fall and apply a top dressing of barnyard manure, giving each tree about two big wagonloads. In fact, spread it over the entire surface about three or four inches deep and you will be astonished at the results. Your trees will take on a new lease of life, make a good growth, and with healthy dark green foliage to take the place of the sickly light green foliage of previous years you will get large crops of excellent fruit. Try it and be convinced. The trouble with most orchards of long standing is that they are hide-bound in bluegrass and starved to death for want of necessary food.

Look after the borers in June and September, spray with insecticides in the spring, and protect the trees against rabbits in the winter by wrapping with paper, or, better still, by applying a thin coat of axle grease to the trunks in November.

DISCUSSION.

MR. JOHNSON—I don't feel like criticising the essay, except in one point. Would it not be better, when you plant trees, to wrap them with wire to keep out the borers and rabbits? That has been my experience.

THE PRESIDENT—How do you keep the borer off with wire?

MR. JOHNSON—With a wire netting put around the tree.

MR. BARNARD—I consider the paper a very able one, covering a great deal of ground, but it seems to me it has omitted one important item; that is, so planting the trees that cross-fertilization is possible. I don't remember to have heard anything said about this in this paper.

MR. PEARSON—It is there.

MR. BARNARD—In planting fruit trees, those should be planted together that are of different varieties but similar habits, in order that fertilization may be effective. The most advanced pomologists are awaking to this fact. I am simply criticising the paper for omitting this in recommending planting, but having covered so much ground that was practical, I think the essay a very excellent one.

MR. SMALL—I didn't notice that he said anything in regard to the depth of planting.

MR. DUNLAP—I think the essay stated.

MR. KELLOGG, of Ionia, Mich.—I notice one recommendation I have given some thought to. I believe it to be a very serious mistake, although it is recommended in the catalogues. I believe it has more to do with the killing of trees than anything else. I refer to the puddling of roots. That is all right for the purpose of carrying them around the field, but ordinarily you use clay and make up a paste about the consistency of cream, just a little thicker than you would make for brick. Now you have put your trees in a material so adhesive that the capillary attraction will not carry the water to the roots. It is filled in between with what constitutes a hard, regular cement. In that condition you put the tree into the ground. You now put in mellow earth, but you have got a wall that it is with the greatest difficulty that the small, hair-like roots will get through. The tree stands there several weeks. After it has been there several weeks, if you will pull it up, you will find little hair roots running alongside of the old root, and looking for a place to get through that stiff mortar clay that you could make bricks of, and if that clay stays there you will find a great shortage of roots. The same thing has been said about strawberries. It does all right if you will wash it off before you put them in the ground. But I believe it is a mistake we have learned to some extent to correct. Just at the time when the tree needs its greatest nourishment it cannot get it.

THE PRESIDENT—Would that apply to all the different kinds of soil used in puddling?

Mr. Kellogg—That would make a great difference. I have had a great many trees come out all right. If you will use some very soft loam, for that dries out very quickly. I would wash off any puddle. That is, for anything I use. Perhaps you have some prairie soil here which is different.

Mr. Goodrich—Your committee, in making the decision on this essay, did not necessarily endorse the essay, it was simply our business to find out which one of the twenty was the best, and which one of the other nineteen was the next best. This same point which Mr. Kellogg criticises in this paper, we discussed in our committee—if I might so far tell something that occurred in the committee—we discussed it at length. It is not for me to say whether we agreed or disagreed, yet we found it in the paper and were not authorized to cut it out or omit it. We submitted the paper as it is, but with my experience I should have to come to the defense of the paper. My experience is the opposite of Mr. Kellogg's. In planting strawberry plants—there is nothing more delicate than strawberry plants—they have to be taken from condition of moisture and coolness to directly under the glare of the hot sun. We have to protect the roots of that plant, beforehand, just as completely as skill can do it. We do not have the best conditions to work with; sometimes we have the worst possible. By puddling we can take our sweet potato plants and put them into absolutely dry dust and make them live, even when we have no rain for two weeks. We take this tenacious clay—and the more tenacious the better—and we hunt up the best on the farm, and muddy just as close up to the strawberry plant as possible—the expression "muddy" is the one that is used. Last year I lost acres of plants just because I didn't muddy them. My experience is just the reverse of Mr. Kellogg's. He will pardon me for differing so radically.

Mr. Winn—There are one or two points that I don't think would apply all over the State. He speaks of barnyard manure for manuring. I think if you will put hogs or sheep in the orchard, you will have the best fertilizer. I would cultivate five years in corn, and then in clover.

Mr. H. J. Dunlap—The barnyard manure was to be applied to the old orchard in bluegrass.

Mr. Morrill—I noticed he advocated putting upright growers with spreading growers, naming the Ben Davis and Minkler, and in that he is undoubtedly correct, although not so essential in apples as in pears. Regarding the suggestion of contending with the borers, I don't know that it applies to your apple, but we have learned to get rid of them by banking our trees in the fall (and, by the way, that is a very excellent way) and leaving it there until after the borer deposits its egg; it will deposit it there and leave the body clean, for they will hatch at a distance from the exposed part; and in that way we have got rid of them almost entirely instead of having to cut them out.

In regard to stable manure, it seems that it is hardly the thing. I understand this writer to have reference to your prairie soil, and I cannot understand why barnyard manure should be good, because that is what you have already too much of in prairie soil. If I wanted to plant in prairie soil I should use clear bonedust and ashes; the bonedust to absorb the carbon, and if you can't get that, use sulphates. At least that is the case in all fruits so far as our State is concerned.

In regard to varieties, I think the essay did not mention varieties.

The President—He refers to the list in our annual reports.

Mr. Morrill—He endorses them?

The President—Yes, sir.

Mr. Morrill—And in regard to the matter of puddling, I think unless that is gone into rather thoroughly, there is liable to be a little misunderstanding on the meaning of "puddling." In puddling it is common to use clay; what is common to us is yellow and blue clay. I think the yellow and blue clay that is used for shipping purposes does not remain there, should not remain there; I wash it off the tree. He advocates puddling when you set the tree. That is quite another thing. That does not harden and cannot as I infer, when setting it in soil already moist, but a certain amount adheres to the roots, and, understanding it that way, I should take the position of the essayist, and I imagine Mr. Kellogg has reference to the way in which it is packed upon the roots sometimes at the nursery.

I usually do without either, simply trimming my trees. When I plant trees, I have them all piled up in one pile, and have a sled with one horse and a man with it, and when the man wants a tree he picks one out of the pile and sets it, and that insures the adherence of the soil, and does away with the necessity of puddling.

Mr. Kellogg—I wish to be clearly understood. I had especial reference to trees being taken up and puddled at the nursery and carried around with the clay on the roots. In my own experience, I never would put a drop of water on a tree when I set it. When you put a tree into the ground and pour water on it there, and mix it up, you have made another clay that is the worst thing possible. It may be all right in your prairie soil here, where it is so full of vegetable matter, but with us it wouldn't do. I suppose I have raised as many trees as most of you. It will dry out in spite of all the surface cultivation you can give. It will dry out. I have taken trees out and found the little roots running along, trying to find places where they can come through. If you will put your trees into the ground and press them down with moist earth, pressing it down firm, you don't need any water. The water is an injury.

Mr. Powell—I would go still further than the gentleman in this essay. There is a great deal of sun-scald in the winter, and also in the summer, mostly in the winter. We have to protect it from the chill, and the sun on a hot day. The sun strikes the tree and then the frost comes and we will find the bark has peeled off from that side of the tree next to the sun. And with all the good setting we can do, if we don't guard against that, we shall fail to make a success. I generally take a fence board and sharpen it on the end and set it on the southeast from four to six inches from the tree; I drive that board down by the tree to shade the tree, and it will stand there three or four years, that is, until the tree gets big enough to shade itself. I set the tree, put the fine dirt around it, and then throw water on it and go on to the next tree, and throw that little fine dirt around the roots at the same time, and don't touch that fine dirt again for half an hour. Let that settle as moist earth. That thing of puddling and making a mortar I don't do at all.

Mr. Corbin—In regard to wetting the roots of trees, I find the best plan is to carry a little pail of water as I set. I believe in

throwing in moist earth; and that applies to spring setting. I find that fall setting is as good as in spring. I get a hundred trees to grow out of every hundred trees I plant in the fall. Unless the trees lean quite well to the southwest and are tramped firmly so they will stand in place they will be removed by the southwest winds.

MR. HARTWELL—My experience is, that planting trees in October and November and having no heavy rains, if we don't sufficiently wet the trees, we will find them dead in the spring.

MR. CORBIN—I had a hundred trees that were set in the middle of November and every one of them grew. The fall was something similar to this, but we had a little rain after they were set. Put in a little loose dirt on the roots, or put some coarse lime around the trees.

THE PRESIDENT—In comparing the numbers, we find the prize, a life membership in the society, for the best essay on the best methods of planting and growing an apple orchard, was awarded to Henry M. Dunlap of Savoy, Illinois.

Mr. Washburn then read the following paper:

THE VEGETABLE GARDEN.

ANDREW WASHBURN, BLOOMINGTON.

Mr. President:

We are probably all agreed that the garden is of great importance, furnishing, as it does, many of the necessities, comforts and luxuries of life, and to those who love the work and engage in it, it gives health and pleasure and profit. No man, for so small an investment, can give to his family a gift that will equal the products of a good fruit, flower and vegetable garden.

Henry Ward Beecher once said that "the liver is the very kingdom of Satan," and he might have added, that the best way to escape the torments of that kingdom is, to make a good garden, care for it, and enjoy its products. There are no nostrums that can compare as health givers with the fruits and vegetables of our gardens, and not any of the so-called tonics that will give the strength that can be had in the manual labor of the garden, and every owner or renter of a small tract of land can find a rich reward in its cultivation, both for himself and family.

With an experience of a quarter of a century as a market gardener, let me assure you that gardening is largely a labor of preparation, and he who engages in the work will be subject to many disappointments and drawbacks unless he has made, or is able to make, the necessary preparation. The market gardener should be located near a good market, where he can readily dispose of his crop, secure manure for fertilizing his ground, and obtain necessary help. Our large cities are not always our best markets, and you will find that the larger the market the harder and sharper will be the competition, and you will not only have to compete with those of your own place, but will come in competition with shipments from other places that will cause gluts, and many times cause prices to fall below the cost of production. In our smaller cities prices are more uniform, and as a rule better.

THE CONDITION OF THE LAND

is a very important matter, and land should be chosen that is naturally good. Soil that is not good may be helped by cultivation and manure. Henderson says, "education improves the shallow mind, but luxuriant crops can no more be expected from a thin and poor soil, no matter how much it is cultivated, than fertile ideas from a shallow brain, educate it as you will." Exposure should be considered, and land lying to the south and east, and sufficiently undulating to carry off readily the surface water, will be found the best, and when choice can be had, if protected by trees on the north and west, it will be found of great advantage. The garden should be well tile drained, and thoroughly enriched by manure from the stables —which is the best of all fertilizers—and put in a condition to produce the best crops, and in these days of great competition and low prices, he only will succeed who has energy, good executive ability, fair intelligence, a knowledge of his market and its needs, sufficient capital, and that knowledge born of experience that will tell him when and where and what to plant, and anyone makes a serious mistake who starts in this business without money enough to enable him, by a judicious use of the same, to take every advantage of his work. The gardener's aim should be to grow the largest crops at the least expense, and to do this he must have the best appliances to carry on his work, be able to purchase needed fertilizers and to pay his help promptly.

But let no one be discouraged by what has been said, for I know of no business that to-day offers greater inducements to those who have a liking for the work, and are willing to intelligently labor and wait for the results that will surely come to him who will stick to his business. And what has been said of the market garden

applies to the family garden as well—the better the preparation the better the result.

Great care should be taken in the selection of seed, to secure such as will germinate properly and be of the best strains of their kind. And it will not be out of the way to say here, that in nothing does price more nearly represent quality than in seeds. Poor seeds are dear at any price, and good seeds you will not be likely to pay too much for. Grow your own seeds when you can and remember that good seeds are largely the results of selection, and are bred up just as our animals are; and good seeds rapidly deteriorate when they miss the lack of the grower's care in throwing out and discarding the poor and saving only the best of its kind for seed stock.

Every year our enterprising seedsmen catalogue novelties, for which they charge extravagant prices and tell more extravagant tales, and those who buy will be very likely to be disappointed and find that many of the old varieties are as good, if not better, than the much lauded and high-priced new ones. Still, it is well to invest a little in the new varieties, for in the many you may find some that are really excellent, and better than any you have previously grown.

I might speak of the importance and necessity of deep and thorough cultivation, but much has already been written about this, and I will only add that the importance of it cannot be overestimated. Our seasons seem to be changing—we get more protracted drouths, the ill effects of which become more and more apparent; deeper plowing, more frequent stirring of the soil, heavier manuring, will all help to overcome the extended dry spells; and this leads me to speak of

IRRIGATION FOR THE GARDEN,

and undoubtedly your first query will be, Will it pay? I answer, it will, and pay well; nothing will pay better when one is able to go to the expense, and too much cannot be said in its favor.

Having been requested to speak of our experience in irrigating our garden crops, I will say that our water supply is from a drilled well, and our power for raising it is steam. We store the water in a large tank and from this tank the water is conveyed by pipes to different parts of our grounds, and the hydrants placed on the highest ground one hundred feet apart, so that with a fifty-feet hose we can reach the whole surface. Our rows are laid out up and down the slope of the land to allow of irrigating to the best advantage, and we run the water in furrows between the rows so as to apply the moisture to the roots rather than to the foliage of the plants, and as soon as the water has soaked away and the ground becomes some-

what firm we cultivate the ground to prevent its baking and becoming hard. Of course this is expensive, and the farmer who grows crops that are worth fifty dollars or less per acre could not afford to go to such an expense, but on the higher priced crops of our gardens where, if the crops are enabled by such watering to mature themselves well, and would otherwise fail in so doing, and by this means we succeed when others less fortunate fail, our additional efforts will be well repaid for the increased expense we may have been to.

We are all interested in the advancement of Horticulture in its various branches, and I think one of the best means to promote an interest in the work of the garden, is to encourage the younger generation in a love for the work, and this can be done in various ways. Our horticultural books, papers, schools and societies, are all doing a good work. But parents have it in their power to help very materially those dependent upon them. Give the children a plot of ground for their own use, help them to buy seeds and plants, and let them have the profits of their labors. I am acquainted with a young man in our own State who, when a boy of 13, had a little space given to him in one of his father's vegetable forcing houses. He made good use of it by growing some geraniums, pansies and verbenas, and as a result of his first season's work sold fifty dollars' worth of flowering plants which were mainly grown at odd times and when he had a little time from his other work. And from that small beginning he has gone on till to-day he has a partnership interest in a very good market garden and floral business, and is the manager of the garden and quite an extensive greenhouse plant, filled with a great variety of flowering stock, the outcome largely of his first boyish efforts in flower growing.

When in Springfield last summer, attending the State Fair, I had occasion to call upon a young lady florist there. When quite young she had a love for flowers and their cultivation, and receiving some encouragement from those interested in her, she has advanced from a small beginning in her chosen work, and almost entirely by her own efforts, till to-day she is the owner and working manager of a floral establishment that would be a credit to any one. Her greenhouses were in good condition, tidy and well kept, and better, healthier, and more thrifty stock would be difficult to find anywhere. Her enterprise is a credit to herself and to her sex. While all who receive help may not succeed so as to take a front rank, still there is no doubt but that you will be well repaid for any efforts that may be made to encourage and assist the young in gardening, an employment for which Washington has said, "No man is too high or too low."

DISCUSSION.

MR. PEARSON—Iwill ask Mr. Washburn if he can tell us what quantity of water he finds necessary, say for an acre of land, to be used for a vegetable garden.

MR. WASHBURN—That depends very much on circumstances. In some crops for instance where we cultivate with the hoe, and the ground becomes hard and dry, it will take up nearly as much water as if cultivated with a horse. I think in cultivating a crop where you work with a hoe, you can do it very well with about 500 barrels of water run through one and one-quarter inch hose. The water has a pretty good pressure and will run through quite fast. But if you're going to work an acre of cabbage thoroughly and have the dirt stirred up by horse power, it will probably take three times the amount of water.

MR. PEARSON—I will put the question another way. What amount of rainfall would you calculate to apply to your ground in a dry time; a quarter of an inch, a half inch, or how much?

MR. WASHBURN—I don't know that I have figured it out. In running over an acre that has been hoed, about 500 barrels, but if it is plowed probably three times as much.

MR. PEARSON—How often would you water it in a dry time?

MR. WASHBURN—As often as it would seem to be necessary. Something depends on the nature of the crop. There are some crops that are better in dry weather. We will take an acre of flowers, say part in carnations and the other part in violets; the carnations will stand the dry weather very much better than the violets.

MR. PEARSON—We are speaking of vegetables, not carnations.

MR. WASHBURN—The same principle will apply. You have to apply it as often as it would seem to be necessary.

MR. PEARSON—Do you think it would apply where you raise vegetables, such as peas, cauliflower, etc.?

MR. WASHBURN—It would for cauliflower, not for peas. With sweet corn, that is one of those low-priced crops with which it would hardly pay.

MR. PEARSON—Do you have to use water irrigation for the early crop or the late?

MR. WASHBURN—For the early crop.

MR. BARNARD—Is it supplied by trenches?

MR. WASHBURN—No, sir. From a hose spread off from the longest and highest point.

MR. AUSCHICK—I have tried a little irrigation myself, and I agree with him in everything he said except on a few points. I think to make a success of gardens, you have to have a love for the business, the same as in anything else. And what is very important is good land. That is the first thing, to have good land and a stable market. I think a good home market is better than shipping, but sometimes you can get good prices in the big cities. About irrigating; I have done a little with the windmill, and don't find it very satisfactory; could not expect much. I had some celery and watered it every day; then I applied the water every other day, and somehow I could not make it grow after we got dry weather. It seemed that the weather was so dry that it did not do any good. It didn't pay. It may be that if we have plenty of water to begin right early, before the ground dries out entirely, that it may be of some benefit. With some crops that are very valuable it may pay, if it don't cost too much.

MR. WASHBURN—How old was the celery?

MR. AUSCHICK—The celery was pretty well grown on the roots. If I had started irrigating sooner, before the ground dried out, I might have had better success.

MR. MANN—There is one essential point, and that is the kind of water you use. The water that contains various mineral substances I have found to be utterly worthless for irrigating. Where I live, in Iroquois county, we have artesian wells. A few years ago I undertook to irrigate with one of those wells; it didn't seem to do any good no matter how much we put on, and an analysis of the water shows that it has lime and magnesia and does not seem to furnish to the plants anything they want. There's no use speculating on the theory. It is simply one of those wells which runs down on the side of a hill and you cannot tell that the water has any effect on the grass.

MR. HARTWELL—I have had a little different experience with the same kind of water, that is, water entirely hard. Now in wetting my celery I couldn't get it to grow when the weather was hot during the wetting period; and after it became cooler, even if we had no rains,

it became cool and my celery grew very nicely in connection with the weather. There is one point. You will suppose I left my surface undisturbed, which was not the case; I broke the surface very carefuly so as to prevent evaporation. I am doubtful if irrigation with hard water is a good thing. Sometimes I thought I didn't put on enough, but when I put on more it didn't do much better.

Mr. Doan—If it is not put on well it will do no good. We use water we get from a pond, running it in a furrow, and have three or four furrows to the acre. We get so much water on it that we cannot walk on it, and before it is dried out or cracked we thoroughly cultivate it, and have no trouble at all. But you have to get it thoroughly wet.

The President—I will ask the secretary if there are any questions in the box? If so, he will please read one of the questions and we will have it answered.

The secretary then read the following question:

What varieties of the tree fruits imported from northern Europe have been found more hardy than our old varieties, and of value to northern Illinois?

Mr. J. V. Cotta was asked to answer this question and replied as follows:

Mr. Cotta—I do not expect to answer this question to your satisfaction, not by any means. Before answering that let us ask this question: Where do all our tree fruits come from? Are they native American? Can anyone answer that question? I tell you there is not as yet a single apple we are growing in this country that is native, except as it is produced from seed grown in this country from imported varieties. The originals were chiefly imported from western Europe, from France, from England and a few from Germany, from a climate very much milder than that of our country. Those varieties have been grown in western Europe for a hundred years no doubt, and the modification they have suffered from being brought from the far East, perhaps western Asia, the modifications they suffered in order to adapt themselves for western Europe did not fit them for the American climate as a class. However, inasmuch as there is no rule without an exception, the early settlers tried a number of experiments and in the early history of the country quite a number of these proved to be valu-

able. Later on as the West began to be settled, we find that varieties which had done exceedingly well in the Eastern States failed to sustain their good character in the western country. This question refers to imported fruits from northern Europe that have been imported in the last twenty or thirty odd years. Those varieties I would mention are the Duchess of Oldenburg, Yellow Transparent and Longfield. The Longfield was imported within the last twenty-three years. These varieties are not all of the same intrinsic value to orchardists. The Oldenburg and Yellow Transparent are hardier than the Longfield. However, in Illinois it is hardy and it is a most wonderful bearer and exceeds the Duchess of Oldenberg, perhaps exceeds both of them. There was a serious mistake made last winter in placing the Longfield on the list of winter apples for northern Illinois. With us it is a September apple and can, with reasonable care, be kept through October, and in exceptional seasons will stand keeping perhaps through November, but it is not a winter apple. There are 500 varieties of Russian, Silesian and northern European apples, but only a few I consider valuable. The Yellow Transparent and Longfield stand at the head of the list. I cannot say much of the other varieties from Russia; still, many of them are quite handsome apples and make a good show at state and county fairs where they are exhibited in Wisconsin and Minnesota, but they are undoubtedly inferior to our fall apples. As a rule, those Russian apples are hardy of timber, and are from seed from western European countries, and, that being the case, there is some future to be hoped for from them in the way of using them for stock. The use of the crabapple for top-grafting has had more or less unsatisfactory results; the crab timber being of much closer and hardier texture does not form a good union with the common apples, whereas the extreme hardy Russians form a good union. I have a few among those Russians that no American apple can outgrow. The Enormous and Hibernal, as disseminated by Mr. Tuttle of Baraboo, are among that class of trees that will not be outgrown by any of our trees, no matter how they are cultivated.

Of the pears, I would say this: The Bessimianka and several other varieties from Russia are extremely hardy, and a few are exempt from blight, but I have not fruited them and cannot say as to their quality or value as fruit. But with some of them I have some hope of using, especially the hardy Russian pear, as stock for our bet-

ter American pears, which only lack in hardiness to make them all right for growing.

I would say of cherries, a year ago last winter in the month of January, 1893, our trees were covered with a very heavy coat of ice and sleet; this stayed on them nearly throughout the month of January, and the result was that as soon as the rays of the sun came out the ice presented such a broad surface and, being convex at the outside, caught the rays of the sun into a focus, burning and scalding the tops of the trees and branches and this caused very serious damage to our fruit trees. A good many of our apple varieties suffered seriously from that cause and likewise our cherries. I lost fourteen varieties of cherries that were entirely killed or seriously injured and that became worthless. Those were the Early Richmond, Montmorency, Dyehouse, Suda Hardy, Carnation, Ostheim and various others of our northwest and several European imported varieties, while the Frauendorfer, Weichsel, Amarelle and a number Sixty-two from Russia, and some other of the hardy Russian varieties escaped entirely. They have not fruited, but are covered with fruit buds for next season and I hope to be able to get fruit from them.

It is an actual fact that our plums are not quite as hardy as European natives. The Quackenbos and a few other kinds appear to be an exception.

MR. AUGUSTINE—Are you sure you are correct in your statement that the Duchess is imported?

MR. COTTA—It has been classed among foreign varieties and bears a pure German name.

MR. MORRILL—I would like to ask about the Yellow Transparent and your Longfield. I would like to know particularly if they are early bearing apples.

MR. COTTA—I find the Yellow Transparent and Longfield are. I want to tell a story of the Longfield. I planted two Longfield trees at the Station orchard in 1887, and they commenced to bear right away. Those trees planted in 1887 commenced to bear in 1889, and have been bearing ever since, and this year I gathered five bushels apiece from them, and they have made a better growth than any variety I have, and consequently than anything else.

MR. MORRILL—Have they borne annually, and please describe them?

MR. COTTA—It is a full, medium sized apple when fully ripe, a pale waxen color with a carmean blush on its sunny side, very similar to Maiden's Blush.

MR. MORRILL—Have you grown the Princess Louise?

MR. COTTA—I never did.

MR. MORRILL—That answers your description of the Longfield and I wondered if it was the same.

MR. PEARSON—It is probably the same family; they ripen at the same time; the two varieties are somewhat alike.

MR. MORRILL—What is the quality of the Longfield as compared with the Yellow Transparent?

MR. COTTA—I cannot tell any difference between the Yellow Transparent, the Charlemont and the Grant Shockley. In regard to the Charlemont, Mr. Tuttle of Baraboo, Wisconsin, says that in Germany the name is Charlemosi and believes it is an offspring of the Duchess of Oldenburg.

THE PRESIDENT—We grow apples quite considerably in our section, and on the question of early bearing, I think there is no apple in our section that bears so frequently in the orchard or so early as the Rome Beauty.

MR. MCCLUER—The gentleman was asking something about its beauty and of its quality. I shall agree with Mr. Cotta that it is an exceptional bearer. We planted two trees of it with a hundred other varieties, in 1888, and that one variety has borne as much as all the other varieties since then. The tree is a rapid grower and makes a good shaped tree; but there is one objection to it, and it is a serious objection. It is the worst apple to rot I ever saw, on the tree or on the ground. It will begin to rot before it is ripe and goes in a little while. It does not last at all. It is not especially handsome, still it is very fair. It is very mild, a sub-acid. It is a little more mild than the Ben Davis.

MR. COTTA—In regard to rotting; I must corroborate the state- of Mr. McCluer, especially this season. But we have had some difficulty with other varieties this season as well. Take the Wealthy and the Fall Orange, and both rotted badly.

MR. CORBIN—Have you any trouble with the Scotch Winter?

MR. COTTA—It is not quite so early a bearer as some others. I have two trees that were planted in 1888, and they have shown only so far a few specimens of fruit, but they are a good, full, medium size and good quality. They are a bright red, with a little striping, but uniformly colored, all of them. About keeping it; it is a firm apple and I should take it to be a good keeper. The tree is a medium grower and appears entirely hardy.

THE PRESIDENT—We are encroaching a little on Tuesday's session. We will now have the next question.

QUESTION—*Are winter onions profitable to raise for market? Give the best method of growing them for winter market.*

Mr. Goodrich, of Cobden, being called upon to answer, replied as follows:

Onion growing has been very profitable in southern Illinois up to two years. I don't know of any vegetable that will repay the outlay like winter onions, but like other good things, too many have been grown, and they are not now so profitable; but we expect to keep on growing them for the Chicago market. There is a good demand there.

Our method is planting in the fall and gathering in the spring and in the early winter, when you intend to ship far. A regular case holds about two dozen bunches, and in Chicago they consume stem, onion and all. The Persian winter onion is a good one. You begin along in March and ship until May. They are planted in the fall; about the first ten days in October.

MR. CORBIN—Will the Egyptian onion stand the winter as far north as this?

MR. GOODRICH—I don't see why it should not, if you protect it. Our method of planting is to put them in the soil to a reasonable depth, such as you can make with a hand plow, throw on as much manure as you can throw, and perhaps farther north you can protect it still further.

MR. CORBIN—I planted about a bushel of winter onions a year ago and have very few specimens of them left. I planted common onions by the side of them and they were all right.

THE PRESIDENT—We have a communication from one of the oldest members of the Society, which the Secretary will please read.

The Secretary read the following letter:

OTTAWA, ILL., December 10, 1894.

To the Illinois State Horticultural Society:

I was for many years one with you in the interest of fruit raising in Illinois in times past, when Dr. Hull of Alton, M. L. Dunlap and O. B. Galusha were leading lights in that industry, the first two of whom have long since passed away. The latter, Mr. Galusha, I have not heard from since I went to Texas seven years ago, in the interest of fruit raising in that country.

From my past knowledge of fruit raising in Illinois of over forty years, and what I have learned in the south, I wish to say a few words of encouragement to the fruit growers of Illinois, and as a first introduction I will quote what a northern man says, who is secretary of a fruit growers' society in Texas. He wrote that "he was discouraged with the loss of fruit in Texas three years in six, and that he believed we had left a better fruit country in Illinois than we had found in Texas, for there are many draw-backs we do not take into account in raising fruit for the home market which are experienced in a country that has to depend almost entirely on a foreign market, the principal of which are the railroads and the rates and time it requires to take the fruit to market. Raising fruit for a home market is like manufacturing for the same." When I was fruit raising in Illinois thirty and forty years ago, all was an experiment, both as regards the kinds to raise and the location and treatment.

I tried pears and plums; the curculio took the plums, and blight the pears, and apple-worms the apples, and lice and sun-scald the trees. Now, I understand, with proper treatment by spraying, most of this except pear-blight can be prevented; but after an experience of fifty years both in Illinois and Texas, the most disastrous drawback to tree fruit raising, both north and south, is the open winters which cause trees to start early, only to be killed by a freeze afterward. To prevent this, I am trying a plan which I would like others to experiment with, and if any have tried I would like to know the result of their experience; my plan is to protect by corn-fodder placed around each tree to retard early starting in the spring and as a protection to the changes of cold and warm spells in winter. In order to do this the trees should be grown to suit the experiment, that is by heading low when young, which is a good plan in all events, as by so growing is a preventive of breaking down by long limbs being over-loaded with a long leverage. I have six peach and several plum trees so protected for this winter. I would like to be with you, but home cares prevent.

Yours respectfully,

G. H. RUGG.

QUESTION—*How can we prevent borers from destroying elms ana maples soon after being transplanted?*

Mr. McCluer replied as follows:

There is one borer that probably does nine-tenths of all the damage done to transplanted trees, and that is what is known as the flatheaded borer, so troublesome in apple orchards. It works along the trunk, and in the elms and maples may get to be a great pest. It comes from a beetle about a quarter of an inch wide and half an inch long; it escapes detection very readily and people don't often see it. It may be seen in the daytime on the southwest side of the tree. You will find it in other places, but most frequently on the southwest side of the tree. Sometimes it is on all sides, when it is very numerous. The beetle lays its eggs from the latter part of May until August, not often as late as August. The egg, soon after it is laid, hatches out and the worm works all around beneath the bark. The best preventive is to wash the tree with some material after the egg is laid, and, in order to do that, the tree must be kept smooth and not have in it deep creases for the eggs to be laid in. In that case they cannot be reached. I wash them in an alkali or common potash, which can be bought of any grocer. When you use the alkali, it should be applied two, three or four times in a season. That ought to protect the tree from the borers. If they get in the tree, they ought to be dug out as soon as they are found, and they can be found in a little while. By examining the tree you will find a little sawdust-like material which is thrown out by the borer, and by taking a penknife you can dig them out. He speaks of a borer that gets into the elm and maple particularly. I have noticed it in several different kinds of oaks, in apple, in box alder, in the coffee tree and in the chestnut, the black heart and quite a number of others, and when it attacks quite a number of trees, it becomes a serious pest to the other trees in this vicinity.

MR. HARTWELL—Does this insect work near the ground?

MR. MCCLUER—I have seen them as much as ten or twelve feet above the ground. There is a different species that does work near the ground. That is called the round head. This flat-headed borer attacks trees that have been recently transplanted.

MR. BRYANT—What effect would wrapping the tree have, wrapping with something loose?

MR. MCCLUER—Yes, some one spoke of a wire netting. If that does not come close up against the tree, it will keep them away; but if it does, then they can get in.

MR. BRYANT—Is not one cause of it the heat or sun-scald? Do you find it where the trees are healthy?

MR. MCCLUER—The borer is not so apt to attack trees that are perfectly healthy. I don't consider a tree perfectly healthy that has been recently transplanted, any more than a man that has had his legs cut off; anything may attack him and carry him off. It's a good deal the same with a tree; it has been weakened by transplanting and the borers attack it. The beetles like to stay in the sun and lay their eggs there.

MR. BRYANT—I have had some cases of sun-scald like that in transplanted trees. I took out a few of the trees from where the bodies had been shaded before the exposure to the sun; they were taken out in the spring and the next summer when the sun struck them, the trees were sun-scalded. We found a good deal of benefit in wrapping the bodies.

QUESTION FROM THE AUDIENCE—I would like to ask Mr. McCluer if he thinks that shading the bodies of the trees will protect them from the borers?

MR. MCCLUER—My opinion is, it would. As I said, they like to work in the sun. If you put something on the southwest side of the trees to protect them from the sun, you will almost entirely prevent it.

MR. CORBIN—I have had some little experience in this. It was a case where the ice lay on the trees all winter; it was around them, but they were there. This season I found almost every tree had borers in in it down to within a foot of the ground.

MR. AUSCHICK—I saw that tried three years and it will keep the sun off the bark and keep the borers out.

The Secretary then read the following question put by Mr. R. Morrill of Benton Harbor, Mich.

QUESTION—*Is the setting of apple trees in the State of Illinois keeping pace with the destruction of the same.*

Mr. Riehl, of Madison Co., being called upon to answer this, replied as follows: I do not know so well what is being done in the

central and northern portion of the State; but in the southern portion we are planting a great many more than are being destroyed. My opinion would be that probably, in the north, the plantings are not keeping up with the destruction, but, taking the whole State over, I think, very decidedly, we have more apple trees growing than we had five or ten years ago.

Mr. Johnson, Hancock Co.—We know that in southern Illinois they have planted very largely, but, notwithstanding this, we should also take into consideration that they are probably losing very largely, and when we take the State as a whole, as the question puts it, as I understand it, my own opinion is that we are not any more than replenishing the losses, if we are doing as much as that. In my own county, there was a sort of boom on, some three years ago, something akin to what they had in Clay county and Marion county, and they planted whole quarter sections, a hundred acres or more, but many of these orchards are entirely gone. It is not every man that plants an orchard that is going to grow an orchard. It seems to me that a great many tree planters do not take into consideration what it requires to grow a tree. A man must give it that commonsense treatment that it would be necessary to give to any other business. The statistics show that there are hundreds of thousands, and I believe even millions, of apple trees planted, but it is mostly in southern Illinois, and as a rule the northern part of the State has less trees in a bearing condition to-day than it had ten years ago.

Mr. Hartwell.—You might say that two years ago, but there are a great many trees planted and bearing now.

Mr. Johnson—And a great many have quit bearing. I know orchards in my own county that were planted, large orchards, and now there is no orchard there at all, not a single tree left. We have learned to think there that the life of an apple orchard is not a very long one. If we think our apple orchards are going to live to the age they did in good old New England and in New York, we are mistaken, and I believe that investigation will bear us out in the statement that we are not really increasing. We have a great deal to contend with, and if we hold our own we will do well.

Mr. Barnard—It occurs to me that the planting of apple trees in the last decade has been confined to one section of the State. Where

are the apple trees that were growing ten years ago? I don't believe that twenty five per cent of them have been replaced. I should incline to the opinion that twenty-five per cent at least had disappeared.

Mr. Pearson, Madison Co.—This matter of the life of an orchard tree is not a new one in this society. I recollect some years ago finding it necessary to grub out some of the trees in my own orchard. I think this society can say to day that the probable life of many of our apple trees is only three to six crops. Some years ago in our local society, I was pleased to exhibit an apple which, as I said, if it never bore another apple, it had paid for itself. I let it stand but the quality of the fruit deteriorated.

Mr. Barnard—Did you spray the tree?

Mr. Pearson—No, sir. Spraying was not introduced then. It was like the Smith's Cider; it was a beautiful fruit, bears well at first, and after six crops there was not a profitable crop on the tree. Trees beside this are still bearing good crops, of the same age, and bear, every alternate year, fair crops for eighteen or nineteen years. With many of our varieties it is different. I should not hesitate to recommend the Benoni; there was no apple that I sold which gave as good satisfaction as the Benoni for the first half-dozen crops. Since then, the ground is covered with them and nobody will pick them up. Hogs will eat them, but they are actually of no value. It is only this: when the tree gets old and full of borers and the fruit gets small, cut it out of your orchard, and you get the use of the land that much sooner. If you think that an apple tree is going to bear for the remainder of your life (if you are as old as I am) you are mistaken. Before that tree fails, you should be on the way with another addition of it. You want to cut them down and get them out of the way.

Mr. Powell—I have raised a great many trees and my business has mostly been watching these things. Where there are a few farmers who have had orchards and those orchards have gone out and new orchards in their place, in the greater number of cases they are not replenishing the old orchards nor are they making new ones; and they are planting only about twenty to fifty trees, whereas in war times they were planting fifty to sixty.

Mr. Foster—I want to corroborate that. The southern part of the State is more than keeping pace while the northern part is falling

back. Twenty-five years from now there will be a great many more in southern Illinois and a great many less in northern Illinois.

Mr. Hartwell, Lee Co.—If what I say is true, then what he says is not true. These are not the facts as I see them.

Mr. Bryant, Bureau Co.—You take it in our part of northern Illinois, at any rate within the last five years, there is much more planting done than they did years ago, but you take the old orchards we had on hand, say fifteen years ago, and there are less trees in the orchards at the present time. But in the last five years, people are planting more trees and taking better care of them than five years ago, and more of the trees planted in this time living than of those planted from five to seven or eight years ago. The most that we planted at that time were carelessly planted and we did not take care of them.

Mr. Winn, Pike Co.—It rather surprised me to hear that the orchard setting has not kept up. In a little pamphlet that Mr. H. M. Dunlap has gotten out, he estimates that in five to ten years' time Illinois will produce five to ten million barrels of apples. In our county, one man and his son have four hundred acres planted and they sold thirty carloads of apples this year. A Chicago man went down there and he has a whole section planted out. I certainly expect to sell apples, but I think the thing is being overdone.

Mr. Herrick, Ogle Co.—My opinion is, that where one tree is set out and lives, twenty die and are grubbed out.

The President—Is this the line on which you wished it treated, Mr. Morrill?

Mr. Morrill—Exactly. The question has sprung from my observation. My travel has not been far south. That is, not farther south than Illinois, but I have noticed that the apple orchards in Illinois and southern Michigan have passed their usefulness; they are breaking off rotten limbs and the orchards are unfruitful and are being torn out, while it is almost universally the case in that section from St. Louis east to the Ohio line and from there east as far as I travel. The citizens of the United States are great apple eaters and I have wondered whether twenty years from now there would be sufficient to supply them. On the other hand, if we believe these southern dealers, somebody is planting apples. Taking my own State of Michigan, for instance, it has produced apples at a wonderful rate in the

past, but now you may travel a hundred miles and not see a hundred of them bearing, and hundreds of them grubbed out. Still we have trees there that are fifty years old. I have been gathering fruit on these trees—and we pick good crops too—some of those are Baldwin apples; but as a general thing the trees have about outlived their usefulness. Where are those big cities to get their apples from?

MR. HARTWELL—There are five thousand dollars' worth of apple trees brought to this town every year.

MR. JOHNSON—I want to say a word about this. We have a neighbor that does not live far away, who began life some twenty or twenty-five years ago and began poor; he had wonderful luck in remaining poor. He came to our place when he first came and said he wanted to fix up his place, and wanted to know if I had not some slips of roses and other things. I told him to help himself and he did, and took some roots of rhubarb; he had quite a little bit of odds and ends. A peddler came along and he bought a bunch of stuff from him every year, and I don't think there has been one year in twenty-five that he has not done the same thing. He never has anything left. I think that, probably, there is not a thing growing on his place except children. We know of just such cases and could tell of them where tree planting is done just like that. Here one gentleman says that five thousand dollars' worth of trees comes to this town annually, and another asks, Where are they? As a matter of fact, I don't think we need be in the least degree alarmed about overdoing the fruit business in this country. We are a people that will have something to live upon. We grumble a good deal, but we live better than our fathers did, and our children will live better than we, if we only produce what we can.

MR. AUGUSTINE—I have observed closely in this State, also in Missouri and Kansas, and I am going to venture the statement that I believe we are planting and successfully growing twenty trees to-day where one of the old trees is dying out. I am not saying about overdoing, but when you see 350,000 acres of apple orchards in our State, and Missouri not far behind us, and Kansas too, there is not much danger of running out.

At this point the convention adjourned until 7:30 P. M.

The meeting was again called to order at 7:30 P.M. and the Secretary read the following question:

QUESTION—*What are the possibilities of making Europe a paying market for American fruit?*

This was referred to Mr. Dunlap of Kankakee, who replied as follows:

MR. DUNLAP—My observation, of course, has been mostly confined to Germany, and my impression is that the market for American apples in Germany is exceedingly limited for the reason that they do not use fruit over there in the quantities we do in this country, and they can supply their home demand without calling on foreigners. It is true there may be exceptions in cases where the home crop is short. I saw a few American apples at Breslau, at Berlin and some other places. They were the Ben Davis, Baldwin and Rome Beauty. They called them "Stetiners," because they were imported at Stetin. They knew they were American apples, but they simply called them Stetiners. American apples are not going to be used very plentifully there, because the German does not spend his money for luxuries and you cannot get him to go outside of a given quantity, if you want to sell him a luxury, by selling it a little cheaper. He is not like the American. If he has any money to spend he puts it into stocks and bonds, and you will find the market for American apples in Germany very limited. It is very possible that at Hamburg, Berlin and Bremen, and other seacoast cities, you will get some market, but in the other cities it will be impossible to work up much trade.

THE SECRETARY then read the following contribution from Mr W. E. Gould of Villa Ridge:

THE FRUIT GROWER'S DREAM.

'Tis night, and 'tis dark; the wind a gale blows.
King Frost is triumphant; it's cold and it snows.
On a hill stands a house half hid among trees,
So that the force of the storm is broken by these.

Within all is warm and cozy and bright;
The house-wife remarks "'tis stormy tonight."
But the fruit grower sits in his lazy arm chair;
He has fallen asleep and his paper lies there.

His mind is in dream land and free from all cares;
His orchards are loaded with apples and pears;
His peach trees are laden with the finest of fruit;
His cherries and plums a king's table would suit.

He wanders beneath the well-laden trees,
And gazes with joy at the birds and the bees.
He dreams of new markets and prices of yore,
That the mortgage is lifted and hard times are o'er.

No bugs nor bark-beetles by him are now found;
No worms nor bacteria in his orchard abound;
Neither drouths nor frosts, nor weather too wet;
No washes nor gullies his life now beset.

His sprayers are rusting in his sheds with disuse,
And formulas forgotten of the mixture Bordeaux.
Dishonest commission men are things of the past,
And freights are reduced, as they should be, at last.

With his soul filled with gladness and joyful in mood,
He gives thanks to his Maker in deep gratitude.
Contentment is his and life is worth living;
A fruit growers' paradise of heaven's own giving.

Mr. Kellogg of Ionia, Mich., then delivered the following address:

FIGHTING THE DROUTH.

Mr. President and Members of The Illinois State Horticultural Society:

I have given much thought to the question of drouth, and after so many dry seasons it is not surprising that the Illinois State Horticultural Society should meet and devote one whole evening to the question of drouth. If you solve this question, Illinois will blossom like the rose.

Few countries suffer so little from drouth as the lands of the Missisippi Valley. The rainfall is not so evenly distributed throughout the months of the year as we could desire, perhaps, but it is abundant, and we have only to take slight precautionary measures to retain an abundance to tide us over the few rainless weeks of midsummer. We have only to manipulate the surface of the soil to accomplish this result. The recently invented pulverizers and weeders enable us to go over from ten to twenty acres per day with one team and do this work most effectually.

The drouth of 1894 was the longest and most severe on record in Michigan. Not only was there no rain from the last of May to near September 1 (except two or three passing clouds which scarcely dropped enough water to lay the dust), but there was an exceptional brilliancy to the sun, and accompanied by hot winds for weeks that drew the water from the ground with the greatest rapidity.

I have never seen vegetation wilt and the ground divested of moisture so quickly; and yet during all these weeks there was not a day when, by removing an inch of the dust on the surface of our twenty acres of spring-set strawberries, as well as raspberries, blackberries and grapes, where you would not find soil so moist you could not only have moulded it, but it felt wet in the hand.

On these beds if you had dug a well fifteen feet deep, you would have found the ground moist all the way down, while if you had gone away twenty-five feet from the edge on the roadside or adjoining grass land and dug to the same depth, it would have been as dry as a bone, even dusty all the way down. These results were secured by a manipulation of a few inches of the surface soil.

Let me see if I can give a rational explanation for the cause of this phenomenon. Have I stumbled into something, and am I yet in the dark as to its real cause? If so, I trust the discussion which shall follow will let in the true light that we may have an intelligent comprehension of the real cause that produced this result.

Capillary action, cohesion and gravity are the great forces that work this wonderful phenomenon. Gravity draws the water down, capillary action calls it to the surface again, and it is the province of the cultivator to facilitate the operation.

Now, let us take coarse gravel perfectly dry, and place it in water; we find the openings so large between the particles of stone that gravity will not permit the water to rise, but when we take very fine, dry sand, we find capillary action is the strongest, and water climbs up through it with the greatest celerity. So, too, in the loam; it passes up but not so freely, being somewhat impeded by the humus between the particles.

We illustrate this action more fully by taking two pieces of glass, clean and dry. At one end we insert a piece of paper to keep the glass further apart, while the other is as close as we can get it. We now place the edge in shallow water and note that capillary action draws the water up much higher in the narrow opening, but scarcely rising at the wider end, because the bulk of water is so great as to overcome capillary action. So, too, in coarse sand, water will not rise for the same reason.

We have here, then, the true explanation of the supply of moisture in our strawberry bed.

But you ask, "Were not the same forces at work in the roadside and grass land only a few feet away, where the ground was powdery dry for so many feet in depth?" Certainly; much more active than in the cultivated field. The tramping of the ground and beating rains had driven the particles of earth so close together that it could hold only a small amount of water, and this was favorable for a very rapid passage of water from below by capillary action, aided by the hot sun which turned it into vapor as it neared the heated surface, and the water kept receding until the earth, to a great depth, soon became devoid of moisture. There was nothing to prevent the water coming clear to the surface and passing off into the air.

The conditions on the strawberry beds were very different. In the first place, we created a reservoir about two and a half feet deep all over the field early in the spring which the rains filled with water, and we kept it there for summer use. We did not let it come to the surface, and capillary action would not let it go down deeper. This is the all important point. In the illustrations I have given you, you notice the water passes up where the soil or sand was very fine much faster than where the particles were coarse, so as to permit gravity to overcome capillary attraction, therefore we must have our soils very fine. I began by going over the surface with a spading harrow, cutting it up six inches deep. This could be done by shallow plowing or any cultivator. Then we harrow, and cross harrow and roll until it is as fine as ashes. Now, we plow about ten inches deep, or as deep as we can without bringing up too much subsoil at a time.

This plow is followed by another in the same furrow, which acts like a huge ground mole about twenty inches below the bottom of the furrow. This breaks it up as fine as can be, driving the particles of earth apart, and making it so mellow you can force your arm down the whole length. This we call subsoiling. The subsoil plow I use is an Illinois product, being made by the John Deere Plow Co. of Moline. It is about as perfect a tool for the purpose as could be devised. We now roll and harrow till we get it as fine as dust, finishing by rolling down hard. This rolling the land is very important, because we want to bring the water up by capillary action, and this it will not do, as already explained, if the ground is too loose. There is another important point here I wish to emphasize. This subsoiling must be done in the fall or very early in the spring. It requires an immense amount of water to fill this large body of loose earth.

Without entering into close mathematical calculations, I believe a piece of ground prepared in this way will hold in suspension six or eight inches of clear water, so you will readily see the necessity of

being on time to catch the spring rains. But what would be the result of subsoiling later in the season? It would surely be very serious. It would fail to fill the loosened subsoil with water, and the ground would be so separated that the water could not be drawn up from the lower strata to the surface soil. It would be almost as much of a barrier as if underlaid with a wooden or stone floor. Right here we have the solution of much of the varied results of subsoiling. In the early subsoiling we catch the spring rain, and not only store up the water, but it settles the subsoil, so connection is made with still lower subsoil, and capillary action comes to the rescue and brings up great quantities of water from the still lower strata, and nothing but months of the hottest sunshine and drying winds can deprive the plants of an abundance of moisture if we take the simple precaution to keep the dust mulch on the surface.

The question now comes up, "Does rolling land help in retaining moisture?" Of itself, it does not. It aids in the escape of moisture. Land rolled down hard will part with its moisture with the greatest rapidity. We want the water to come to the surface, but stop there for the use of plants, and wherever land is rolled, it should be at once harrowed lightly on the surface to make the dust mulch.

Last summer I had a discussion with my foreman. I directed him to have the men take fine rakes, and, with their hands, break up the crust between the plants. He declared it was a mistake; that the water came near to the surface every morning, but at night he admitted that it was two or three inches below. That was the trouble. It was coming to the surface and I wanted to stop it. Some of my neighbors joined him in the laugh, but they are not laughing now and will not laugh when we reach the market next season. I have the largest plants I ever saw. They let the crust remain and the continued drouth finished up their plants. I am perhaps a trifle selfish, but I personally do not object to dry seasons. It improves the market and prices, you know. It is not especially unpleasant to get caught with the only fancy stock in the neighborhood. I fear I am stuck that way for next year. But I must not get to boasting.

Now let me say a word about fighting the drouth on the strawberry bed. You do too much work; at least five to ten times as much as you should and only get about a quarter of what you should have, and you grow the kind of berries that glut the market. The market demands something better, and will seek and richly reward the man who can furnish it.

I will take five minutes to tell you how I manage my berry fields. I fit the ground as described. I maintain a high degree of fruiting power in my plants by restricting fruitage and selecting only ideal plants to propagate from. I have no missing hills, and no plants not bearing fruit.

In setting plants, I use the perfection plant setter or cone maker,

which makes a little mound like the letter A, and the roots are dropped all around it. It has a gauge so no plant can get in too deep or too shallow, and every root is separate and imbedded in soft, mellow earth, so the weeding machine cannot injure or tear them out. As soon as set, I go over it with the Breed Weeder loosening up the surface, and cultivating ten to twelve acres per day. I don't care if my enemy comes in the night and sows ten bushels of weed seed per acre. He has the worst of it. He will have more trouble in putting the weed seed on than I do in killing the weeds. This weeder covers two rows at a time as fast as you can walk and every weed is dead, but not a plant is injured in the least. No matter how close to the plant the weeds are, they are torn out and the whole surface covered with a fine dust mulch. I go over the ground immediately after every rain and as often as every four days anyhow. If you do not have the weeder, set your plants 30 x 30 inches and cultivate both ways, using the Planet Jr. twelve-tooth cultivator and pulverizer attachment, or set in rows three and one-half feet apart and thirty inches in row, and cultivate both ways. Keep runners off till the last of July and then let them grow. The plants have become well established, roots down deep, the soil mellow and friable, the weed seed all germinated and killed by cultivator, and large, stocky runners will soon start out, and, the fall rains coming on, will strike root quickly and before freezing will be larger than those which have rooted in spring and battled with the drouth all summer. You have saved all hand weeding, and added to, if not doubled, your crop.

In hill culture, or semi-hill culture, you consolidate many small plants, and many small berries, into one large one so nothing is lost. Every time you cut a runner, you get a new crown and fruit bud. Roots increase and go down deeper and further out in search of food and moisture to perfect big berries and lots of them. It solves the question of the drouth by keeping the ground stirred close to the hills till fall rains come.

The great difficulty has been to keep the runners off, but the automatic runner cutter made by the Strawberry Tool Co. of Ionia, Mich., solves that problem. A good, active boy can take the machine and cut every one on over three acres per day. Just place it over the hill and push down; the fingers gather the runners up and draw them under the knives which clip them clear and nice and not a leaf is injured.

Now let me state how the average berry grower proceeds. In the first place, he spreads a large quantity of coarse straw manure on his ground, puts on his jointer and plows it all under carefully, and—what? He fixes a strawy mulch next the subsoil that shuts off capillary action so water cannot come up to the surface where the roots are, and the large lumps which he has turned down leave air chambers. He scratches the surface over a little with a short stubbed-tooth harrow; never uses a roller to firm his ground, but takes the corn-marker and makes a

furrow two or three inches deep, zigzagging around, and then chucks in a spade, moving it around till he makes a glazed surface all over, which no root can penetrate; whipes his roots in and closes it with his foot, encasing the roots between two plastered walls. Many are set so deep the crowns rot or make a feeble growth, or others are set an inch or two too high and new roots cannot start, or a late spring frost freezes the roots so the plant dies. A drouth follows; the soil all around his plants is so loose that capillary action will not draw moisture up for the plants. He now starts in to cultivate with a big tooth cultivator and goes at it with a vengeance. He crowds it down to the bottom, loosens up the ground, and if the drouth continues it gets dryer than ever. He knows, or thinks he knows, that stirring the ground makes it wet. Stirring the ground makes it dryer. Just put a few bushels of earth in a box and stir it every day for a week and see how wet it will get. Every time you let drying winds into the ground the water goes out.

Go out into the road where the wheels have ground the dust up fine. It is as dry as powder. But dig to firm soil and you will find it wet in dryest times. The facts are that the ground will dry out as deep as you cultivate.

The runners soon start and he throws them around in a string; some of them commence to root and the cultivator tears them out. They will never try to root again unless buried in the soil, nor will any plant root unless the top of the ground is wet. He soon narrows up his cultivator, and a crust forms over a streak often fifteen inches wide, and capillary action being perfect the water flows off. Worse than all, a great mass of runners depend on the mother plant. Plant food is water, with just a little food, which is taken up and carried to the leaves, where it is assimilated. Plants breathe through their leaves and, in so doing, give off several times their weight in water every day. All this comes from the few inches of soil covered by the mother plant. The plants wilt, become stunted, and when fall rains do come they are too weak to start a growth. He does not mulch, but the next spring, after they have been freezing and thawing all winter, he puts the cultivator on and tears up the ground, mangles the roots, and throws dirt on the blossoms when they are taking pollen, and then spends his energies in cursing the grocerymen because they can't make the people eat his little, dirty, flavorless berries.

Now a word about winter killing of orchards and berry bushes. That is a misnomer. It should be "summer killing." The warm spring rains and sunshine start a vigorous growth in the spring. In the woods the ground is covered with leaves to prevent evaporation, and only an unheard-of drouth can do serious damage; but our orchards and berry fields are bare, and the scalding sun turns the

moisture into steam and it escapes and, unless covered with some mulch, dries out to a great depth.

In midsummer, growth is suspended and leaves ripen, and buds form for next year, and if the drouth continues branches dry up, and a sort of gum forms in the wood cells that impedes free action. Later on the rains come and the trees start into a vigorous growth, and often new leaves start out again, and when killing frosts come the leaves and tree are green, and all at once growth is stopped by killing the leaves. You must not lose sight of the fact that wood never changes a particle if the leaves, which are the digestive apparatus, are wanting. Now we must prevent this stoppage of growth in midsummer. Keep the cultivator or harrow going until the drouth is over. Make no effort to stimulate a growth after the first of August, unless a severe drouth continues. The amount of rainfall must govern as to how late you should cultivate. When the time comes for frost the leaves are ripe and wood is free from sap, and growth is fully suspended. Winter can do no harm. I wish to emphasize this in regard to cultivating raspberries and blackberries. The feet of the pickers pack the ground down hard as a bone. Keep the cultivators going after every picking twice per week. I never have any berries dry up.

The past season we had no rain for weeks before or after harvest, but when rains came the canes were as thrifty as in June, and they are in fine shape for winter. I never give any protection to berry bushes, never have a failure, never have even a light crop, and every crop is a profitable one, but it does not happen by chance.

SETTING TREES.

Many nurserymen urge, in their catalogues, that you should puddle the roots of a tree; that is, make a thin mortar and put the roots into it. It is all right if you wash it all off before you set the tree. It will leave a crust all over the roots which no little feeding rootlets can penetrate, and will cause the death of, or stunt, a hundred trees where it saves one.

Then again, they tell you to set the tree and fill half full with earth, then pour in a pailful of water and tread the soil in among the roots. The soil will mush it all right, but it is a horrid blunder; your tree sets in a mortar bed, and it will bake and dry out, especially on clay soil, and will injure the tree.

Make your ground as fine and mellow as possible, and work it in firmly among the roots and pack in so capillary action can obtain to draw the water to roots and leave some fine earth loose at the sur-

face. If the tree is alive when set don't worry but that it will not only live, but at the end of three years will be far ahead of the trees set in the mortar bed.

MULCHING.

Mulching is all right wherever cultivating cannot be had. It is often absolutely necessary. It must be sufficiently dense to exclude the air from the surface. Light straw, or any substance that will admit air or readily absorb moisture, is a dead failure. A wide board, sheet iron, or anything which water cannot pass through is good. Perhaps the best is coarse straw manure well packed down. As explained in the case of plowing under coarse manure, capillary action is very slow if it works at all. There are many objections to mulching. It is a harbor for insects and fungi. The plant roots need the warmth of the sun and must have air, and will come very close to the surface to get it, and when once established you must add more and more, and always rely upon it. If afterward you cultivate, you are sure to tear the roots and greatly injure the tree. I prefer cultivation, because it not only does the same work, but does much more; much of the plant food is locked up in the soil in insoluble forms. The oxygen of the air, while the great destroyer, is also the great life-giving agent. In lands frequently cultivated it unlocks the plant food—makes it available for plant growth. It keeps down noxious weeds, and crops do better until the humus burns out. You cannot cultivate land for years without letting it rest or filling it with some kind of humus. Capillary action in pure clay or sand is too active. The interstices are too large, and the water gathers in too large spaces and comes to the surface too readily. The plants cannot combine the nutriments. There must be a humus in the soil to absorb it and prevent this active circulation.

Take the lower strata. No matter how much plant food there is in it, a plant will not thrive. Continual stirring of the soil year after year burns the humus out. Liberal application of barnyard manure will greatly aid in this respect, but it is impossible for the general fruit grower to apply enough of it, if he has a large acreage. It is not difficult to apply enough manure to make land manure sick. The better way is to seed down and fill the ground with roots. For this purpose a leguminous plant should be used, which shall gather from the atmosphere the costly nitrogen. The greatest of all this family of plants is clover. For the purpose of fitting ground to withstand drouth and growing large crops of any kind of small fruit, I had rather have a heavy clover sod with about fifty bushels of unleached wood ashes per acre (provided the ground is plowed rightly)

than any other preparation obtainable. Ground liberally supplied with this humus will hold very much more water and not part with it, and will not settle down so dense and bake.

Plowing too wet so as to mortar the ground by stirring it is a fearful mistake. It disarranges the particles composing the earth, impacts a cement between them, and imprisons the plant food, rendering it impossible for feeding roots to penetrate it. During a hot, dry time it will bake as deep as plowed in spite of all you can do. Nor will several years of after cultivation rearrange the atoms of the soil so as to enable it to assume its normal condition. The injury to sandy land, while not so much, perhaps, as clay, yet is very serious. It will assume the appearance of having been burned. The water passes out of it more readily and its humus will be speedily burned out. No land should ever be plowed if, by taking it in the hands and kneading it, it will "paste" or refuse to remain mellow.

TILING.

When water stands in the ground for a considerable time, it sours it and disarranges its atoms. It forms various chemical changes which are fatal to root growth. Tile never removes any water needed in the land, and land should never remain saturated with water more than a few hours. The surplus should pass off quickly. All that remains beyond that held by capillary action is a positive injury to anything but an aquatic plant. Tile has a tendency to enlarge capillary passages and enables the ground to hold more water as well as to render it more friable. You will always find the big berries and big corn directly over the tile.

IRRIGATION.

I do not care to spend any time on the subject of irrigation. I have had no experience with it.

Watering plants, as generally done, kills more than it benefits. Don't dab on a little every day, but fill the ground, then mulch or stir the surface soil. I generally take a crowbar and make holes and get it down deep and then stir the surface. It will come to the surface quickly enough.

It is perfectly safe to say that every summer will be more or less drouthy, and the successful fruit grower is the one who will take that into consideration. Begin in time; make your ground fine. Make a reservoir under it and keep the surface covered with the dust mulch, and you will get rich, own a national bank and die happy, and your heirs will grieve because there is a tax on legacies.

COMMITTEE APPOINTMENTS.

The President then announced that Mr. R. N. McCauley of Olney, Mr. G. W. Foster of Bloomington and Mr. H. R. Cotta had been appointed as a committee on final resolutions.

Also that G. W. McCluer of Champaign, T. E. Goodrich of Cobden, and R. G. Walker of Griggsville had been appointed a committee to examine the sprayers and other implements on exhibition at this meeting.

At this point the meeting was adjourned until 9 A. M., Wednesday, December 12.

WEDNESDAY, DECEMBER 12, AT 9 A. M.

The meeting was called to order by President Augustine and Rev. Dr. Ruthrauff of St. Paul'sL utheran church was invited to open the session by prayer.

MR. MINKLER—I think it was when our organization was first at Alton; it was all ready to do business and I proposed there that the obligation we were under to Almighty God made it proper to open our meeting with prayer. The brethren fell right in with it and it has been kept up ever since and I hope you will continue it when I am gone.

THE PRESIDENT—I think our interests are so closely indentified with the work of the Creator that horticulturists are all inclined that way.

There seems to be an impression among the members that we should close up this meeting to-morrow afternoon. There has been no public action taken, but I think that is the general feeling. As many of them wish to go home to-morrow afternoon before the evening session, we will crowd things along and get that portion of the program in a little earlier. There are a few things that must be brought up, that are not on the program. One of these is our report from the delegates to other States. Mr. Hartwell was appointed, last year, at our meeting at Springfield, as the delegate to Wisconsin and we have not had the report from him.

Mr. Hartwell will now give us his report before we take up the regular program.

MR. HARTWELL—I appreciate the honors you conferred by electing me your delegate. I take it you simply want to know what might be of assistance to us in our work. Wisconsin, of course, is not perfect. They are organized there under State supervision and have an elaborate system of work. They locate their State meeting at the capital and hold it there once a year. They have local meetings around over the State during the year. What seems important for us to consider, they have a summer session. In addition to this, I would call attention to the fact that they relegate all of the experimental horticultural work to the children of the State. The scheme has taken form. They ask the different plant producers to contribute to the schools of the State a certain number of plants to be sent to the children who shall apply for them; the only condition being that the child shall report on the result.

REPORT OF DELEGATE TO WISCONSIN HORTICULTURAL SOCIETY.

J. L. HARTWELL, DIXON.

Mr. President:

My visit to Madison last February, as a delegate to the meeting of the Wisconsin Horticultural Society, was a peculiarly enjoyable one and presented to me many surprises. During the few years that I have been a member of this society, I have noticed that the interest and enthusiasm along certain lines of horticultural work seemed to diminish in passing from the southern to the northern extremity of this remarkably long State. This change in sentiment seemed referable at once to the change in latitude and, as Wisconsin is possessed of no materially different physical peculiarities from our own State except higher latitude, I very naturally, as it seems to me, concluded that the enthusiasm would continue to diminish and would finally disappear altogether before the northern limit of the State was reached. You can well imagine my surprise when I found a considerable part of their program was devoted to the growing of apples, and, what was still more of a surprise, that there are many commercial orchards in the State of Wisconsin and that many more are being planted even near the northern boundary.

"Can apples be grown in northern Illinois?" has been a prominent topic in the Horticultural Society meetings of this part of our State for a number of years. Such a question would excite a smile in a Wisconsin horticultural meeting. With Cassius they would say to

us, "The fault, dear Brutus, is not in our stars, but in ourselves that we are underlings." While we have been sleeping and complaining they have been thinking and working. Their success is referable to the following points: First, general care of the orchard; second, selection of hardy adapted varieties; third, selection of orchard site as to lay of land and kind of soil; fourth, spraying. It is my impression that Wisconsin is producing more new varieties of apples each year than any other State in the Union. Probably the most potent cause that placed Wisconsin so high in the scale of horticultural work is her system of institutes under State supervision. To this agency may be traced her wonderful advancement in dairy interests also. There are four corps of institute workers under the general direction of a superintendent. Farming, dairying and horticultural interests are represented in each of these corps by some one who is specially qualified. By this means Horticulture is intelligently discussed in all parts of Wisconsin, where it is possible to grow fruit, at least once a year. These lecturers receive $5.00 for each institute they attend, and their expenses. I obtained my ideas of their usefulness in talking with farmers on the train on my way to and from Madison.

The exercises of the convention, of which you doubtless expect to hear something, were interesting throughout. The topics bore chiefly on small fruit and apples. Much stress was given to varieties which were first presented by committees and afterward discussed and voted on by the convention. A large proportion of those in attendance were delegates from local societies of which there are a large number, whose expenses are paid by the State society. The presence of many ladies was a noticeable feature, especially when contrasted with our own meetings. I find the names of all the wives of married members in the annual report. As your delegate, I was royally entertained by the society and was the recipient of many courtesies from individual members.

By the courtesy of the management of the State University, those in attendance at the convention were provided with conveyances to the grounds of that institution, where we were shown through the horticultural and dairy departments in detail. The students of horticulture are provided with a new building, elegantly and substantially constructed, in which are commodious lecture and class rooms, laboratory and experimental department, etc. In the latter were young men under training in the several tasks peculiar to the nursery, garden and fruit farm, such as making grafting wax, cutting and inserting scions, setting plants, using hand cultivators, spray pumps, etc.

If the best and poorest quarter-sections in the two States respectively could be so amalgamated as to make an average half section, Illinois would doubtless lead by several points. Her location as to climate is certainly not inferior to Wisconsin from a horticultural standpoint. If the impressions which I received while in Madison last winter

are correct, it stands us in hand to bestir ourselves or our neighbors on the north will carry off the laurels which Providence evidently intended for us.

DELEGATES INTRODUCED.

THE PRESIDENT—We have with us a delegate from the Iowa Society, one from the Missouri Society and two from Michigan. The two from Michigan were in so early that they have become pretty well acquainted with the members, but I shall be pleased if the gentlemen will come to the front and give us the opportunity to introduce them to our members.

The gentlemen came forward and the president introduced to the members Mr. W. H. Guilford of Iowa, Mr. D. A. Bobinet of Missouri, R. M. Kellogg of Ionia, Mich., and R. Morrill of Benton Harbor, Mich. (The delegates were received with applause.)

Mr. Kellogg is the president of the Central Michigan Society and those of you who heard his paper last evening need no introduction. We will pass over temporarily the discussion of Mr. Kellogg's paper and also Mr. Hartwell's report and go to the next item on the program, which is a paper by Mr. Warfield of Sandoval.

STRAWBERRIES—CULTIVATION, VARIETIES AND MARKETING.

B. C. WARFIELD, SANDOVAL.

Mr. President:

The subject before us has been so fully written upon and discussed at our horticultural meetings, in the last ten years, that if you expect me to advance new ideas, I fear you will be disappointed. The strawberry stands at the head of the list of small fruits, and is aptly called the queen of berries.

SOIL AND PREPARATION.

You can grow strawberries on most any soil, with proper cultivation, but a deep sandy loam is best. Never use freshly manured, nor sod ground, for the former is apt to dry out the soil, and the plants will die, and the sod ground is most likely to produce many white grubs, which cut the roots of plants. Any land that will grow sixty bushels of corn to the acre will produce good strawberries. It

should be well drained. For best results, plow in the fall from eight to ten inches deep, making the land into beds two rods wide, for surface drainage. It is desirable to have land free from weed seed by previous clean culture. Then in the spring, plow up the beds again as early as the ground will work well. With disk harrow, drag, and roller, work the beds down firmly. If land is flat, make the beds so water will drain to the dead-furrows. It is very important that the surface be made smooth and free from holes where water will stand. Now mark off the rows three and a half feet apart with any good hand marker. I use the wheels of a corn cultivator, put on a home made wood axle with tongue attached, so as to pull by hand. If you can do so, it is better to cross-mark the beds into rows two feet apart, so as to cultivate both ways, making nine rows on each bed.

PLANTS AND PLANTING.

It is important to have good strong plants, true to name; these should be grown in new beds, that have never borne fruit, each variety far enough apart to insure no mixture. Dig up the whole row; by so doing, you will have good average plants. In digging during hot, windy weather, take a wet sack and put the plants in as fast as dug; it will prevent drying, which is killing to plants. Trim off all dead leaves, runners and bloom buds, if far enough advanced; if not remove the bloom soon after planting as possible. Spring is the best time to plant—the earlier the better, provided the soil works well. Plant with spade, or trowel; I prefer the latter. Slant the hole very little so in firming the soil around plants it will be closed to the bottom. Set the crown even with the surface, roots spread fan-shaped. Better cut them to three inches than have them curled up. Plant for quality rather than quantity; this is best insured by planting fertilizing plants in separate rows. Then there will be no mixture of berries in the boxes. I would plant every third row with a staminate variety for fertilizing the pistillate plants.

CULTIVATION.

This should begin as soon after planting as weeds appear. I bar off with a Brunton plow, two inches deep, throwing soil from the row; then with hoes scrape off all weeds, taking care not to loosen the plants, work the dirt back with a cultivator. If it is a wet spring it may be necessary to scrape the second time. If dry loosen between the hills with hoes, if planted one way. If marked both ways this loosening can best be done by cultivator. Never allow a crust to form after a rain. Work often but never when wet, so as to bake the

soil; shallow cultivation for dry weather, to form a dust mulch; this prevents the moisture from escaping. I roll with a two-horse roller several times in a dry season like the past one.

For all strong growers, the matted row is most profitable. After the first of July quit cultivating the narrow way and place the runners not less than three or four inches apart, and cover with fine soil, to hold them in place. Keep up cultivation until the first of September. The last hoeing, fine dirt should be pulled up all over the row. If the plants become too thick in the row, take an iron rake and pull out all runners and small plants, in October.

CULTIVATION OF AN OLD PATCH.

After the berries are picked, run a mower over the patch, cutting close to the ground, let the vines dry and rake between the rows, burn late in the afternoon. This will kill many troublesome insects. If you have not a good stand of vines, then don't burn; either rake the straw into the dead-furrows, or haul it off. Bar off the rows eight or ten inches wide, and not more than two inches deep; pulverize the soil between the rows. I use a disk harrow with the two center disks out, and only leaving three on a side; then straddle each row twice, this will work it up fine; with a sharp pointed hoe chop out all weeds. Keep the soil loose and mellow. The first of September throw this fine dirt over the plants with a hoe or small bar plow and drag off all clods and leave a half inch of fine soil on the row. It will need no more care until time to mulch.

MULCHING.

This should be done as soon as it is cold enough to form ice. Cover, so as to hide the plants, with straw, after shaking out all chaff and wheat. About six loads per acre. This should be raked off the row, last of March, or first of April, and left between the rows.

VARIETIES.

Their number is legion. Only a few have proven suitable for general cultivation. Of these the most popular are Warfield, Bubach, Haverland, and Crescent, all pistillates, and require to be pollenized with some good Staminate, like Capt Jack or Splendid. For an all purpose berry I prefer the Warfield. Plant only the variety that does best in the locality and for the purpose you wish to plant; go slow on new varieties, test them before planting largely.

MARKETING.

Have nice clean packages, well seasoned. Damp or wet boxes will mould the berries. See that none but good sound berries are put in the boxes; this can be better done while the pickers are at work; have some person to visit the pickers often while filling the boxes; see that every berry is picked with a half inch stem. This will prevent bruising; never turn out the berries at the shed if possible to avoid, for this will bruise them more or less. Pickers should not be allowed to keep the berries out in the boxes exposed to the sun too long after picking. For his reason small pickers should only have a four-quart hand crate. Pick every day, and better if they can all be gathered before 10 A. M. Patronize only one firm in a town, and remember, your reputation in the future depends on a continuation of good berries to your customers. You cannot force people to buy a poor article, but you may induce them to buy, by having fine berries and boxes well filled. Let me say to beginners, don't sit down and figure out the profits on a large scale with the same proportion as you have done in a small way, for you will be disappointed.

DISCUSSION.

MR. MINKLER—The paper is all right.

MR. HARTWELL—I think father Minkler's remark is all right for his locality, perhaps, but some of those things must be taken with a modification. I was thinking of the last point, that is, patronizing but one firm in a town. For instance, there are twelve or fourteen grocery stores in this town and they all want to sell strawberries. Suppose for instance I was the only grower in this district. Another grocer says to me, "I want strawberries." I have to say to him: "I can't sell to you, because I am selling to Jones." He would say: "Very well, I will go to Chicago for my berries." Then in come the Chicago berries and down I come. The outcome would be I would have at least one competitor, and the next year probably ten or twelve. Furthermore, dealers handle berries in a different manner. We have two firms here who are willing to crowd the business a little and sell to every one. There is one firm that asks nobody to buy berries except their special customers. If I was dealing with him, I could not make any money unless I went out and sold to others.

MR. CORBIN—If I sold my berries to but one man, I would sell

but very few quarts a day. The variety I have is Peter Wood. It is a splendid bearer, yields a good crop, is somewhat soft for a market berry, and a light color; that is the only objection. I find it to be an excellent thing, in growing plants, about the last time, or the time before the last, that you work them to throw a little of the soil right over the top of your plants; it will keep them from wilting and drying out. It appears to be the best thing I can do.

Mr. Hartwell—I should like to ask if anybody has ever tried throwing a furrow of earth over them and tried winter mulching.

Mr. Morrill—He would be sorry for it if he did.

Mr. Corbin—Simply put a little loose earth over them.

Mr. Warfield—We have heavy rains, and after the rain the water runs off and the plants will be on the high ground, and that hurts them. We put a little dirt on the plants in the fall when the runners begin to grow. A little dirt will hold the plant there and encourage it.

Mr. Doan—Do you do it with a hoe?

Mr. Warfield—Often it is done with a plow—a plow and a one-horse drag. In this way is formed a little bed for the plant to lay in.

Prof. Burrill—He speaks of one thing that I know is not usual. That is in propagating the plants for setting. He says to grow plants in a special bed for planting out; the common thing is to go to the bearing rows and gather up plants for the new plantation; that is, take the plants from the fruiting rows. There is an excellent chance to mix the varieties that may come up in the rows. Speaking to two or three, they say to me, "I have never seen the seedling in the ordinary fruiting bed." Mr. Warfield says he picks them out frequently in the rows. If this is a fact (and it would seem to be, for the reason that the old conditions are not favorable to the growth of the seedling and the new life), then we have an excellent explanation of the running out of varieties. If we want to keep the Warfield strawberry pure, and we are propagating from the ordinary rows, we will have to be pretty sharp in recognizing our plants if we are to be certain of results. And it is the experience of everybody that you cannot pick out haphazard seedlings from those plants that have proved themselves by long use to be very desirable. Mix in with them seedlings, one here and one there, and plant your rows, and

pretty soon you have a different variety of berries from what you have had. Is it a common practice, in growing plants for setting, to keep them to themselves?

MR. GUILFORD of Iowa.—Some twenty-five years ago I was advised to leave the city and went to the country for my health, and I decided that the fruit growing business was what I would follow. Not knowing where to get advice, I sent over to one of your veteran Illinois horticulturists, Mr. O. B. Galusha. I gave him an estimate of about how much ground I wanted to put in strawberries. I enclosed the money to him—all I felt I could afford to invest. I had four acres of land. He sent me fifty dollars' worth of strawberries, telling me that there was not more than three or four varieties of them that would be of any value to me, but that after two or three years' experimenting I would know which would be the most desirable. I think that advice was the most wholesome I have ever got. In place of lumbering along for years, I did all my experimenting in two or three years, and at the end of that time threw away what was not profitable and kept what was. I never regretted the advice of Mr. Galusha. He gave me some excellent advice, which was in harmony with our friend, Mr. Warfield's. He was aware of the size of the city and knew how many acres of ground I had in, and told me to select some good merchant to handle my crop and to stay with him. I have been in the business for twenty years and have changed once. The man I deal with now handles from forty to sixty cases a day and he would handle a hundred if the market called for them. He has the reputation of handling home-grown berries, and if he did not get them home-grown he would not handle them at all. I don't ship at all. I go down there at 11 o'clock in the morning promptly and promptly at 5 in the evening, and his wagon drives up and takes every case I have—never fails. Then we have a kind of sliding scale of prices. When berries are low my man don't make much and I don't. When they are high he sometimes makes three cents a box and sometimes only one cent. He is well satisfied with the condition of affairs and I know that I could not do better. Mr. Warfield has suggested some ideas I think good, particularly about the sandy soil. I think it is an idea that will do to think over.

MR. MORRILL—I was pleased with the thought that Professor Burrill threw in there and Mr. Warfield touched upon lightly, and that

is the necessity of growing the plants separately and the fact that so many of our plants are ignorantly selected. I have not the advantage of a scientific education, but there are a few things I notice. One that has struck me most forcibly is this: Take a given row of strawberries. You pass along that row and find occasionally an exceptionally fine hill (I have reference to the picking of the berries), and perhaps the very next hill you will find a hill of the very same variety with a lesser amount of fruit, and of these two the productive hill makes but very few plants. It exhausts in growing fruit. It is this tendency to productiveness of fruit; the other has a tendency to productiveness of plant. It is a common rule that like will produce like, or nearly so. The old way of taking up the plant was to take up the plant you could not use for bearing. Stop for a moment and think what that means. That means you take off from that hill four, five or six plants that don't produce fruit worth owning. You take those and set them out. It is simply a question of arithmetical progression. You have four or five times this hill. Why should not they run out? You are propagating from a barren stem. How to overcome that did not bother me long. The only way to overcome that and get my new stock was to let these plants come on and make fruit, but before the ripening process sets in I can determine which plant suits me and I go to work and cut the fruit off. I take a basket of headliners, and when I find a hill that suits cut off all the fruit and stick a headliner in it. I have a plant to propagate with an inch of root and an inch or two inches of stem, and I take it to the propagating bed and set it under the soil, water it about twice a day and give it a good start, and then I know I have stock from the best in those hills. While I am running out the tendency to make plants I am gaining the tendency to make fruit. If I cut the blossoms away I could not determine which hill I wanted. I don't think any of our plant growers, who are legitimate plant growers, ever take the pollen off the bud. We cultivate both ways, keep the runners off till they are well established, and throw up a little dirt on each as they are ready to root. Then it will show a good, strong plant, and without something of that kind the variety must run out. With that I do not believe there is much danger of their running out.

MR. MCCLUER—We selected both good and poor young plants instead of good only, and we failed entirely to find any difference in

the fruit value—plants from the hill producing the best and from the hill producing poor plants; when they fruited they were so near alike that it was impossible to make a selection. Some things can be changed by selecting. I believe there is something in selection. I saw an article in the *Rural New Yorker* which said change frequently.

MR. MORRILL—That illustrates the value of complete experiment by trained men. Here for fifteen years I have believed that was the way to do that, and here is an expert man who says that it does not make any difference. I never attempted to propagate those. I accepted it as a fact that they were poor, and here I have succeeded, I think. However, I may make the mistake of stating an experiment half done. I didn't believe it was necessary and I succeeded so well the other way.

MR. KELLOGG—I have conducted an experiment and my results are different. I have made it with Wilson's strawberries. One of my neighbors approved of my ideas and he had taken his plants from my bed. I went and got a few plants, and when I came to pick my berries the pickers quarreled because they had to pick that row. Experiments will not always give proper results. I regard mine as fair because Mr. Pullman has taken his bearers from those hills and has taken them and set them out in alternate rows, and you can tell them as far as you can see the rows. You take it for a series of years and it will come out. I am satisfied that great results can be obtained. It is just in the seed crown as it is in everything else.

MR. CARTER—I would like to ask Mr. Kellogg if those plants he produced were directly from that bed.

MR. KELLOGG—They were from a bed I had set out the previous year. The balance I took were from a new set bed, but the plants were from that bed.

MR. WARFIELD—I don't throw any dirt on a new bed with horse-power; but take an old bed, you can do it just as well with horse-power. Don't do it on a new patch.

MR. MORRILL—Didn't you find any rotten crown after that?

MR. WARFIELD—No, sir. There is one other point. You should look after quality instead of quantity. My neighbors claim that they

can produce one hundred and fifty cases to the acre, but I can produce less and make more money. You must take into consideration that one case at $2.50 will bring as much money as three cases at $1.

CURRANTS AND GOOSEBERRIES.

GEO. J. FOSTER, BLOOMINGTON.

Mr. President:

Currants and gooseberries are of very considerable importance in our list of small fruits, although they are sometimes omitted entirely in the market garden, and seldom receive that care and attention which their merit deserves.

Our common garden currants all originated from *Ribes Rubrum*, the native red currant of northern Europe, a species of which is also found in the swamps of northern New England, and west to Wisconsin. In its native state it is always found red or black, and the white or bronze varieties have been produced by cultivation.

To the Dutch gardeners we are indebted for first endeavors to improve this fruit, which they commenced at an early date, but not until about the beginning of the present century did their efforts attain much success.

The currant is propagated from cuttings, which should be made from young and vigorous shoots of the last year's growth, and planted in early fall, in nursery rows thirty inches apart and about two inches apart in the row. At the approach of winter, the ground should be covered with some old straw or coarse litter to protect them till spring, when it should be removed and the young plants carefully hoed and cultivated for two years, when they will have become strong and well rooted, ready to transplant in the border or garden for fruiting. Nothing is easier to cultivate than the currant, and we may add, nothing more sadly neglected. The common mode of culture in this country is to plant along the garden fence, hedge row, or similar place, and after a year or so allowed to grow up with the grass and weeds, utterly neglected, until fruiting time, when, as a matter of course, only a small crop of insignificant berries can be gathered, and those with difficulty. The currant is then pronounced unprofitable and the whole matter forgotten till some new sort is brought out before the public, when the same routine is gone over again with like results. Now the currant is one of the most profitable of all our marketable berries, and while our gardeners are crowding the groceries and overloading the market with blackberries, raspberries, etc., the grocers are daily beseeching them for currants, which they cannot furnish. Finally it must be far back from even a

small market when the currant will not pay equally well with other fruits.

The currant is very impatient of drouth and should always be planted in very deep, rich soil, and when set out or transplanted where they are to remain, the rows should be six feet apart and about three feet in the row. At this time all the buds or suckers below the surface of the ground should be cut off, and only those above the surface be left to form the bush or tree, as they should be grown in tree form.

The next thing is thorough cultivation—allow no weeds or grass, and in fall cover the ground with good well composted manure. This should be worked into the soil in early spring, which will not only afford the proper nourishment but also help to keep the ground moist and cool, a condition always desirable for either the currant or gooseberry.

Pruning is also an important item and should be done in the fall after the leaves are gone. It is sometimes recommended that the stem of the plant should be kept up a foot or more from the ground before branching, which may do well for a moist climate, but under our hot Illinois sun we prefer the branches close to the ground.

All old, crooked and worthless wood should be cut away, the branches thinned out and the heads evenly distributed.

Currants, like gooseberries, bear their fruit on shoots two or more years old, and hence it is necessary that a number of new strong shoots be left annually for future crops.

The size of the fruit may be increased by pinching off the ends of the strong and growing shoots, in June, when the fruit is about half grown.

Currants for market should be picked when ripe and not left till over ripe, when they become soft and drop from the stem. They should always be picked with the stems on, and handled carefully in quart boxes and crates.

Of the many varieties of currants in cultivation a short list only is needed for the market garden. Among the best we notice Cherry, Fay's Prolific, Knight's Early Red, Red Dutch, Victoria and White Dutch. The Cherry and Fay's Prolific are both very productive and the berries are of extra large size. Knight's Early Red ripens a few days in advance of other sorts, while Victoria is a fine berry that ripens last of all. Red Dutch, as is well known, is invaluable and stands among the currants in the same relation as the Concord grape among grapes, the standard by which all others are measured. White Dutch, precisely similar to the Red Dutch in habit, with fruit a little larger and with considerable less acid than the red currants; it is therefore sometimes preferred to them for table use.

From its fine growth, easy culture, great productiveness and extreme hardiness, the currant is one of our most valuable summer fruits. It is indispensable for jellies and tarts, as no other fruit can take its place; and who does not enjoy the refreshing, cool and pleasant acid flavor of a dish of ripe red currants for breakfast on a warm July morning?

The black currant is a distinct species, with larger leaves and coarser growth. The whole plant has a strong odor disagreeable to most persons. The fruit of this species has been improved but little by cultivation. Its taste is peculiar and is not generally relished.

The Buffalo or Missouri currant is another species, native of this country and quite ornamental. It is remarkable for the spicy fragrance of its yellow flowers in early spring, is largely cultivated and quite desirable.

The culture of the gooseberry in this country has been an interesting theme since its earliest history. Almost every one at all interested in fruit growing has at one time or other tried the gooseberry, and while the majority of these have perhaps been somewhat disappointed, there never was a time when the demand for this fruit was as great as at present, a fact of which all our horticulturists and growers of small fruits should take due notice, for it is an encouraging sign of the times when our people come to more fully realize that the fruit of the gooseberry is much better suited to their present needs than the "fruit of the gods" and some others with high sounding names, but of no practical value. There is no fruit more healthful or more pleasant and agreeable when properly prepared. It aids digestion, acts as a tonic, toning up the system and strengthening the whole person, which makes the cares of life lighter and our hopes brighter, thus helping to harmonize us with our surroundings and our great Creator.

What has been said about the culture of the currant applies with equal or added force to the gooseberry. Land that will grow fifty bushels of corn per acre is not sufficient. Ground suitable for growing gooseberries should be able to grow one hundred bushels of corn per acre in a fair season, and yet, be it said to the credit of the gooseberry, the man that has a back yard twenty feet square, where he could really grow but little else, can grow nearly all the fruit his family needs. For this reason it is that the English mechanics, weavers, tradesmen and others who have but very small plats of ground have attained such success in this line. Their annual shows exhibit this fruit in its greatest perfection. They publish a gooseberry book, giving a list of the prize sorts, etc. One catalogue enumerates one hundred and forty-nine sorts worthy of notice. "Lindley's Guide to the Orchard" gives a list of more than seven hundred prize sorts.

That eminent Scotch author and horticulturist, Mr. Loudon, considered the gooseberry the most valuable of all fruits, "since it can be grown in less space, in more unfavorable circumstances, and brought sooner into bearing than any other."

The gooseberry is capable of taking on an almost endless variety of form, size and color. It is useless, however, to expect to attain success without persistent effort on the part of the grower.

While in England they have such an extended list of varieties and seem to be more highly favored in the way of climate, growing many sorts that fail here, we have a few varieties that are valuable, and nothing but a want of knowledge about the method of growing and marketing need prevent any one from starting a good paying business. One great hindrance to growing gooseberries in this country by those who grow other small fruits for market, is the difficulty they have in getting them picked. It costs too much, they say. Gooseberries, unlike all other berries when picked, are very firm and can be handled as easily as marbles. Having grown them for several years a few words in regard to the manner of doing it may not be amiss. Good sized boys, about fifteen years of age, are usually the best pickers, each of whom is supplied with a pair of leather gloves and a good sized basket with large open top, a common bushel basket is convenient. This he places at his feet under the bush and, having donned the gloves, rakes off the berries and leaves (such of the latter as happen to come with the fruit) into the basket, and, when the basket is as full as is convenient to handle, it is taken to the end of the row and emptied into an ordinary fanning mill, which, operated by the man in charge of the job, quickly separates the berries from the leaves, stems and hulls, and runs them into quart boxes and crates, ready for the market. They may be marketed the day they are picked or the day after, and may be sent to Chicago, St. Paul, or wherever you choose. There is plenty of time, and no rush for fear they will "stick together" or "settle down" or "leak juice" from the crate, and the boxes are never stained, thus making a bad appearance.

In the local market the dealer is not afraid to buy for fear they will spoil before he can dispose of them, simply because he knows they will keep.

Houghton and Downing we have found most profitable for the market. For home culture there is perhaps none better than the Downing. Of the English sorts we think the Industry takes the lead in a general way.

DISCUSSION.

MR. MENDENHALL—I believe the gentleman does not say anything about the trouble we meet with from worms. He might give us some pointers about how he gets rid of them.

MR. MORRILL—I should take some exceptions to the paper, looking at it from a market grower's standpoint. I notice Mr. Foster thinks the tree form of growing currants is best.

THE PRESIDENT—I think it is the reverse.

MR. FOSTER—The tree form for either currants or gooseberries.

MR. MORRILL—My experience and that of my neighbors is entirely against the tree form. The manner is in budding your scions. It makes a very pretty thing, but the borer works with us and when you cut away you have no chance for renewal. We like a renewal all through the wood, and the plantation will last twice as long, easily. But I disagree with Mr. Foster, looking at it from a market grower's standpoint, one who wants to make dollars.

We set them a little farther apart too; we set them four by seven, and sometimes as high as four by eight. I do know of one patch, that patch is six years old and it is one of the finest I ever saw.

Now, when he comes to varieties, I disagree almost totally. I have never seen a good Fay's plantation yet, nor ever saw a man who could put his hand on one. Nelson Bogue of New York, where they originated, says that he never did. Our people of Michigan have been swindled more on the Fay currant than on any other. He recommends the Red Dutch also; but with us, the borer will clean them out, just as sure as fate. The Victoria is quite common there and we have but little trouble with the Victoria. If you have the Red Dutch or Fay's, the beetle lays its egg right where there is a little dust, when the foliage is coming out. This is as early as in May, with us. You walk through the patch and if there is a top that is weak, one where the bud is not pushing out vigorously, just cut that off and usually you will find a borer working there; and we cut down until we get to a little hole with a little rosette above it.

MR. SMALL—How about gooseberries?

MR. MORRILL—We agree with him on gooseberries. The Houghton is very good but the Downing is better on the market, and for

home the Industry. We find men expect to get something out of them, for they are very promising.

MR. HARTWELL—What is this rosette?

MR. MORRILL—We do not know. I presume it is common to the Houghton but did not find it on the Downing. The English varieties are very promising in New York. The station men and growers think they are going to get good results from the Industry. I find the Columbus the most promising. It is said to be American, but I think there is a little English blood in it. The Red Jacket has been set out with a great flourish of trumpets. It has a little heavy, hard spot in it. I have seen that on the Red Jacket; but have not noticed it on the Columbus. The only trouble with the Columbus is it has a tough skin; but the Downing is our reliance. In currants, if there is anything with us that will beat the Victoria, it is the London Market. They have what they call the Petosa, brought out from Milwaukee. Mr. Stickney made a lot of money on them, north of us in Michigan; but the London Market and Prince Albert are as standard as the Victoria.

MR. SMALL—I must say that I was pleased with that total for central and northern Illinois. I believe we greatly undervalue currants and gooseberries. The Fay's is worthless at Kankakee and the North Star beats anything we have so far, for productiveness. The soil is underlaid with limestone.

MR. AUGUSTINE—Are you in earnest about that?

MR. SMALL—Yes, sir. It grows something like blackberries. Had a hundred plants and the first lot stood way up and made a permanent growth and bore well.

In regard to gooseberries; we have experimented with fifty or sixty varieties and the Houghton is the only good one with us.

MR. MORRILL—My experience is against the North Star. The fruit is so small and they are on excellent land that produces other currants.

MR. AUGUSTINE—They are a good deal smaller than the Red Dutch.

MR. GUILFORD—I have had some for about twelve years; and among other things is the North Star, and it is not worth anything

with me. They are so small that the last berries were not bigger than a No. 2 shot. They make a strong growth, but do not do anything else.

I am a little surprised about the reports on gooseberries. We have the Columbus, Chautauqua, Industry and Triumph? The Columbus is not affected much with rust but it is worthless when full size and ripe. The chickens pick them off and their beaks peck into the outside until the berries look like musk melons.

MADE HONORARY MEMBERS.

MR. BARNARD—I move you, sir, that the visiting delegates from other States be made honorary members of this society, and the motion being seconded, was put to the house and carried unanimously.

RASPBERRIES AND BLACKBERRIES.

H. R. COTTA, FREEPORT.

Mr. President:

It is evident, from the fact that a northern man was selected for this subject, that the managemeat of this society especially had reference to the growing of raspberries and blackberries in the northern half of our State. Therefore I will confine myself to facts that have come under my observation in northern Illinois during the past few years.

Here the easiest grown of any small fruit is the raspberry. Certainly well adapted to our soil and climate, growing, as it does, wild in fence corners and hedges without the least care, yet many of these wild bushes produce fruit every year. The many adapted varieties in cultivation admit of the greatest variation in color and flavor of any small fruit grown anywhere. The period of ripening is also long, lasting fully five weeks.

That much improvement has been made admits of no doubt. Were I eompelled to go back to varieties in general cultivation twenty years ago I would slide out of the fruit business as suddenly as my ability would permit me to do. Of black varieties a few years ago the Gregg was considered a marvel. Now we have the Kansas fully as large and so much earlier that almost its entire crop is harvested before the Gregg begins to ripen. Its habit of growth is much more preferable, branching freely and producing very large crops. The Older is nearly as large as Gregg, also earlier and much

more productive though not as good a shipper. Palmer is the best extra early variety and is superseding Tyler and Souhegan. The Ohio is also a strong grower, fruit juicy and sweet but not as large as the others mentioned, Shaffer's Colossal has done well with me but is not a good shipper. The best selling and most valuable bright red berry is Cuthbert, with Turner still second, Golden Queen, large, productive, the best yellow.

A new variety, the Columbian, exhibited at Marengo last week, is of extra large size, and I think the finest flavored raspberry canned that I ever had the pleasure of tasting.

Any good corn land is good enough for raspberries. It should not be too rich, yet the fertility must be kept up in bearing plantations. It is a mistake to expect to harvest heavy crops every year without returning some fertility. After two or three large crops are taken from a piece of ground the bushes often seem exhausted, when it is merely the exhaustion of available properties in the soil. By adding to the soil after every large crop is taken from it, your plantation will last much longer.

Before planting, the soil should be well plowed and pulverized by frequent harrowing, when of a proper degree of moisture. The fine roots must be well cared for while out of the ground, as they air-dry very quickly, and many failures are due alone to this cause.

In planting, fine moist soil must be placed about the roots of each plant and well packed, but in such a way as not to injure the roots or the young roots. Many failures also result from too close planting; two and one-half by seven feet is close enough for black-cap varieties and two and one half by six feet for Cuthbert, Golden Queen and other strong growing reds; while I have had good success in growing Turner in narrow rows, five feet apart, not allowing the row to spread more than six inches wide. Many plantations are set too shallow, and are easily blown over by the wind. The crown of black raspberries should be covered with three or four inches of soil, and red varieties should be planted a good depth.

Cultivation should be thorough, frequent and shallow. I find the latest improved Planet Jr. tools best for this purpose. It is seldom necessary to do any hand hoeing if the cultivating is properly done.

If black raspberries make a strong growth the first year, pinch off with your thumb and finger the tops of the new canes as soon as they get about one foot high. It will be necessary to go over your rows two or three times as the canes will not all be tall enough the first time. If they only make a light growth they will need no pinch ing back the first season. The second season, and each year there-

after, pinch off new canes when about two feet high. In cutting back canes or branches of raspberries I always wait until spring, after growth begins, so I can tell at a glance just where to trim. When sound I leave branches or laterals from one to one and one-half feet long; when injured or killed I always cut back to sound wood, allowing one of the sound branches longer to partly make up for those that I cut shorter. Cuthbert and Golden Queen should be pruned much the same way, and all suckers must be treated as weeds. You cannot grow a crop of suckers and fruit from the same bushes at the same time. Turner I do not pinch off, but cut back to about three feet from the ground in the spring. Don't allow more than six canes in a hill of Cuthbert or Golden Queen, and don't allow the hill to become more than one foot in diameter at the surface of the ground.

Blackberry growing in this part of the State is yet in its infancy. Nor have the possibilities been even dreamed of. Think of it, $5,500 received for the fruit produced on ten acres of land in one year. That in Wisconsin. Why not in Illinois? Because Illinois don't try.

Now what is necessary to success? Soil; the very best you have, moist, mellow and rich. Plow and put in the very best possible condition before planting.

Never plant anything but Ancient Britain, unless you have something better. Set only strong young plants that are in a healthy and sound condition. See to it that every plant is just what it should be before setting. After marking the ground both ways plow a furrow where the row is to be; the top roots should be covered three or four inches deep; pack the ground firmly with the foot to prevent drying out. Do not allow anything but mellow, moist soil to come in contact with the roots when planting. Blackberry roots must not be allowed to dry while out of the ground and must be wet when they are set. Plants should be set three by seven feet apart, and I think best to have rows run north and south where convenient.

Planting should be done in the fall or very early in the spring. If set in the fall, throw a fork full of strawy manure over each plant to protect during winter. Remove this in the spring, and see to it that there is no crust of earth over the young shoots when they are about to come through.

Cultivation should begin very early in the spring and be kept up until September 1, and should be shallow, but as thorough as possible. All suckers must be treated as weeds. Enrich the soil every year and prune the same as raspberries, except that laterals should be left about two feet long. Blackberries do not fruit as close to

the main cane as raspberries, and on this account laterals should be left longer. If we want a full crop every year in addition to the above we must cover our bushes as they do in Wisconsin.

In gathering, each row is numbered. Each picker is given a row and must pick it clean before he gets another. Each picker is supplied with a hand crate holding six one-quart boxes. When filled he brings them to the packing shed. If they are satisfactory his ticket is punched; if not he gets no pay. Each picker is numbered and his number is placed on his box; in case fraud is detected the guilty person is at once known. I make no written contracts with my pickers. All full tickets are cashed on Saturdays after picking for that day is done.

I sell no fruit on commission. I supply six or eight dealers every day except Sunday with fruit to retail by the box, and supply consumers by the case direct, selling to them at a uniform price during the entire season, and, as far as possible, keeping the prices to dealers uniform.

DISCUSSION.

MR. SOVERHILL—The gentleman states the proper time to trim raspberries, but he does not say when to trim blackberries.

MR. COTTA—I mentioned that they are to be pinched back about the same as the raspberries, when the canes are about two feet high.

MR. CORBIN—Is there not a late raspberry that will take the place of the blackberry?

MR. COTTA—I don't know of any other late varieties, as late as Gregg.

MR. AUSCHICK—Is there any better blackberry than the Snyder?

MR. MORRILL—The Favor is clear ahead of it.

MR. AUSCHICK—I never heard that variety mentioned in his paper. I have been very successful with the Snyder. From what I produced on half an acre, I picked three thousand quarts for three years in succession.

MR. FOSTER—The Snyder is much the better of the two.

MR. COTTA—Several years ago they were. Now the Ancient Britain is giving most satisfaction in Wisconsin, and the Snyder is entirely discarded. In certain points the Ancient Britain is more

susceptible of cultivation. One of those points is it is more easily bent down.

MR. SMALL—You don't lay the Snyder down?

MR. COTTA—We do. Hundreds of them. And we have them ripen with the very best results. We secure regular crops every season by this mode of laying down. The Ancient Britain is a bigger berry, and in quality is certainly fuller, if not better.

MR. SMALL—After keeping it, it turns red or brownish.

MR. BARNARD—Do they ripen together?

MR. COTTA—No.

MR. DOAN—The original plant came from England. It was brought over by Baldwin about fifteen years ago. It is not quite so large with us as the Snyder, but comes on later; it is a long berry and very fine and a good seller. I don't think that the way we grow the Snyder, we could turn it down at all; it will break. Don't see how it is possible to. But the Ancient Britain is small.

MR. MORRILL of Michigan—I have been in the blackberry business for many years and with us we lay everything down. The only two varieties that satisfy us fully are native; they are the Early Harvest and the Wilson. The Snyder we have discarded. Another berry we have is the Red Jacket, which has a red jacket around the stem. It will produce two or three large crops. Most of the roots are within six or eight inches of the surface and it gives down in a drouth quicker than anything else; whereas, the Wilson will come right through flush and full of sap right up to the last picking. With the Snyder I never saw a case of them go to Chicago and be opened up there the next day but what they were partially spoiled. The Taylor gets through first because it is early, although much smaller in amount. If it is on land that is inclined to dry out, it will dry out, The Early Harvest is an upright grower, but it grows up and branches out in this direction. It is one of that class of berries you don't want to depend on. By the way, we train our blackberries on wire. We lay them down and spread them out in fan-shape. It looks like considerable expense, and it is, but it comes back to us in the cultivation and picking. You can put your cultivator as near as you please to the row and not disturb them, and we hoe our blackberries prob-

ably four or five times before they are picked, and usually once and sometimes twice afterward.

Mr. Small—How high do you put the wire?

Mr. Morrill—Two feet four inches, and we tie it to a good, strong oak staple, with the wire on the ground. In the spring we shake those bushes out from the covering and straighten them up, and draw the wire up and tie it. About three out of five buds are leaf buds on the Wilson, while on the Snyder and Harvest the fruit buds are close together.

Mr. Kellogg—I wish to say a word in regard to a berry which we consider better than the Snyder. I have found a preference for the Western Triumph. It has been on my farm for fifteen or sixteen years; it roots deeper; it stands the drouth better and the berries are somewhat larger; it does not turn red in the box; I have never given it any protection and I have never lost a crop. Just how it will do here, I don't know. It ripens with the Snyder. It is the earliest berry I have, and the Taylor, which is a great favorite, follows it, so I am in the market with some kind of a berry all the time.

Mr. Herrick—I differ from Mr. Cotta in regard to trimming the blackcaps. I get larger crops and better ones by nipping back and letting them go until spring, instead of cutting so many laterals. I may not get so many berries, but they are larger ones.

Mr. Cotta—I don't understand in what respect he differs from me. I think his plan is the same as mine.

Mr. Herrick—You pinch back and get more laterals. I have no laterals whatever. I let the cane grow on for the season after it is started.

Mr. McCluer—I would like to speak of the Wilson Jr. With us it has been a miserable failure at Champaign. It is not hardy, but it will produce a few very large berries and a good many small receptacles with nothing in them. If it is a lack of fertilization, I don't see how that could come, because it is planted along with a number of other varieties; the Early Harvest for one, which is considered the best bearer we have. We have had the Early Harvest there at the Station for our own use and we sold everything and had to send down in southern Illinois and get wild berries for our own use, and they do grow good wild berries there in southern Illinois.

THE PRESIDENT—We will now hear the report of the committee on the revised fruit list from southern Illinois, because Mr. Pearson expects to go away and wants to make the report.

MR. PEARSON—I want to say that it has not been the aim of the committee to enumerate the best varieties of fruit we know of, but to recommend to people setting out orchards something they can depend upon, leaving the great open field, from which we hope to eventually get a better variety of apples than we have, to the speculation of the farmer and the amateur.

REVISED FRUIT LIST FOR SOUTHERN ILLINOIS.

REPORT OF COMMITTEE.

Mr. President:

Your committee, to whom was assigned the duty of revising the fruit list for southern Illinois, respectfully reports that by frequent correspondence they have agreed to recommend the following, and have assigned some reasons therefor.

FRUIT FOR FAMILY USE.

For a list of one hundred trees for a farmer's orchard plant for summer:

Yellow Transparent, a variety so well proven as to have nearly displaced Early Harvest, and is unanimously recommended.

Keswick Codlin is best for cooking, ready for use when half grown and holds on long and still is good.

Benoni, on young trees, easily is one of the best. As the trees grow old there is a tendency to overbear, and the fruit is small. Ten years of bearing exhausts its supply of large fruit.

Duchess, Cornell's Fancy, Red Astrachan. Of the six varieties enumerated, plant two each and add one Sweet Bough to the list.

For late summer and fall, plant Maiden's Blush, Jonathan, Grimes' Golden and Lowell, three each, and one Bailey's Sweet. These are all so well known that any remarks seem unnecessary. Lowell is perhaps least known but, when grown, is thought indispensable. It makes a vigorous, spreading tree and bears abundantly.

For winter, Ben Davis, Minkler, Rawles' Janet, Rome Beauty and York Imperial. All well known except the last and this we confidently recommend. Four trees of each variety.

Rawles' Janet is not now as popular as formerly, but in exceptional seasons, as in 1894, is of the highest value.

Willow, we commend for such locations as do not produce the "bitter rot."

Rome Beauty must have rich soil.

FOR PEARS,

we recommend Clapp's Favorite, to be picked early and ripened in doors. Bartlett, Seckel, Sheldon, Duchess, Anjou, Winter Nellis and Keiffer, two each. These give a succession in about the order named. All are improved by early picking, except Seckel, which last must hang on the tree until nearly fit to eat.

PEACHES.

Troths, Thurber, Mountain Rose, Oldmixon, Stump, Smock and Elberta, four trees of each.

PLUMS.

Blue Damson, two trees.

CHERRIES.

Early Richmond and Montmorency, two each. We wish to add that the former is short lived, and one must set out for a succession. The trees seldom produce more than three good crops.

QUINCES.

One each of the Orange and Champion.

SMALL FRUITS.

The variety of small fruits is very large, and is continually changing, by the skillful labor of professionals and the power of advertising. We believe that exceedingly fine berries are oftener the reward of excellent cultivation than of the latest discoverer.

We recommend strawberries as known and grown in southern Illinois, pistillate varieties; Crescent, Bubach and Warfield, with Wolverton to fertilize, also Edgar Sanders and Beverly.

RASPBERRIES.

Red, a patch of Brandywine and Turner. Blackcaps, Ohio and Nemaha.

BLACKBERRIES.

Snyder, Erie and Taylor.

CURRANTS.

Red Dutch and Victoria.

GOOSEBERRIES.

Houghton and Downing.

When in bearing, the above named sorts will furnish variety and a supply for the whole season.

FOR GRAPES,

Moore's Early, Concord and Niagara. For the extra southern portion of the District, the Ives.

PLANTING FOR MARKET.

For a commercial orchard of one thousand trees we need but few varieties and such as will yield a supply through a long season.

The committee recommends, for summer apples, Yellow Transparent, Duchess, Keswick Codlin and Cornell's Fancy. Thirty trees of each. For late summer and fall, Jonathan and Grimes' Golden, fifty trees of each. . For winter, Ben Davis, 300 trees, Minkler, Willow, 150 each.

PEARS—Bartlett, Duchess, Anjou and Keiffer. Twenty-five trees of each.

PEACHES—Mountain Rose, Oldmixon Free, Stump, Thurber, Elberta. Twenty trees of each.

CHERRY—Fifteen Early Richmond.

QUINCE—Orange and Champion. Ten each.

For the southern half of the district the committee recommends fewer of the summer apples and more of the peaches. Many new varieties have been warmly recommended, but your committee thinks that, for a list to be published and recommended, the above will prove satisfactory.

Respectfully submitted,

JNO. M. PEARSON,
Chairman.

DISCUSSION.

MR. RIEHL—While, in the main, I agree with the report, in some points I would differ. One of these is this: speaking of apples for private use the committee recommends three trees of Grimes' Golden. Now, while the Grimes' Golden is a very good apple when you get it in good condition, there is none better for cooking, but it is almost too good, the trouble is, it is an early apple and we don't get very much

good of it, as we get but a few on our trees. They don't bear well and I don't know whether I would plant any of the Grimes' Golden. I got it from Dr. Warder, but it has never been satisfactory, and I would not recommend planting it except to a limited extent.

Of the Bailey Sweet, the committee recommends one tree. It has been one of the best summer apples I have had in my orchard, of all that I have had, and if I would plant more than one tree of a variety for summer use, certainly the Bailey Sweet would be one of them. I will go further in the criticism of the list of apples for private use. Three trees of summer and fall apples are too many to be planted of one variety, I don't care what that variety is. While for commercial orchards I believe in few varieties, for family use I go to the other extreme. I believe in many, for the reason that we want to continue in apples for family use all the season through. While some seasons some varieties will do well, other seasons other varieties will bear and do better than the others, and for that reason I want more varieties. I would want that in all fruits for family use.

Mr. Hartwell—What about the Rambo?

Mr. Riehl—That is all right. For peaches, four trees. Four trees of a variety will give you more peaches of a kind than a family needs, and it cuts your variety short and you don't cover the season. The committee does not recommend enough varieties for a commercial orchard. No one can cover a season from beginning to end with the varieties recommended; and if you go into the peach business you want to cover the season from beginning to end. If you are in the market you must have a continuous supply on the market or lose your crop. Not only that, you will have your orchard and appliances that are not in use half the time. You will have, say Troth's Early; when you are through marketing them, the next thing is Mountain Rose. There is not very much difference, but by going from some varieties to others, there is a gap where you have nothing for your help to do.

Mr. Pearson—I expect the committee meant to cut off that class of Alexander and Beatrice. They didn't think it necessary to recommend any of them in Illinois.

Mr. Riehl—You not only have to cover the season with the varieties from beginning to end, but you have to cover it double.

There are some that don't do well, and it is well to have enough varieties and enough of each variety so that you will be sure to cover the time of each variety for the season.

The committee says the Early Richmond has to be planted every three or four years in order to have successful fruit, but I have trees planted thirty-two years ago, and I get the largest crops on them.

MR. PERRINE—We have a great number of trees where we are, and there are Grimes' Golden in the county, and wherever I have seen them they have been full. Two years ago when we had almost no apples at all, all the Grimes' Golden that we had were full, loaded, and so I believe in the Grimes' Golden in our section, for it certainly does well there.

MR. WILLIAMS—I want to say my experience with the Grimes' Golden is the same as Mr. Perrine's. I had a good crop and almost everything else failed. Some growers claimed they made more apples to the tree than the Ben Davis, and I consider them next to the Ben Davis. I think one of the best apples we have in our section is the Grimes' Golden.

MR. PEARSON—I want to say there is no member of the society whose criticism I would value more highly than Mr. Riehl's, and if there be a gap, as he suggests, I should be glad to have him make a motion to fill it out. We want the report to be right, and if there is a gap we want it to be covered; but we have the Mountain Rose and the Mixon and the Stump. There is not a gap that I know of, but if you think there is let us have a motion.

MR. PERRINE—The Elberta comes in there and the Thurber and Oldmixon, perhaps it comes between the Mixon and the Stump.

MR. WINN—I am surprised that Mr. Riehl should take the position he has on the Grimes' Golden. Those of you who are on the Executive Board, and many others, will recollect that among the apples southern Illinois sent up to the World's Fair, from the crop picked the year before, there was nothing so beautiful or that excelled the Grimes' Golden. I further recollect of some we had on exhibition and were giving them around. Certainly I never saw anything that equaled them, I don't care what State they came from. I gave a number of them away to men who had charge of exhibits from other States, and I requested them if they had anything that was equal to it, to

bring it around, and I never had any one attempt it. I think the Fairfield is a good apple.

MR. MENDENHALL, Marion county—In the list of grapes, Moore's Early is given, and it seems to me that ought to be left out, at least in our portion of southern Illinois. It is one of the slowest growing vines we have and one of the poorest producers. Then we come to the Champion quince. The season is not long enough to ripen it up, and there is no quince we have which is more subject to blight.

In the list of blackberries, I believe the growers throughout southern Illinois make more money out of the Early Harvest than any other, and I believe that was entirely left out. I would like to add also the Lucretia dewberry.

MR. RIEHL—Now in reference to the criticisms those other gentlemen make, they are from southern Illinois. They refer to the crop grown in 1892. Was there any other crop so profitable? I had to discard the Grimes' Golden. I have grown that for fifteen years and it has never been profitable.

MR. FOSTER—I was sorry that Mr. Pearson's nerve failed him when he came to the Abundance plum, and the committee in another year at least, will have no hesitancy in putting it on their list.

THE PRESIDENT—If you think it ought to go on, put it in form of a motion.

MR. FOSTER—I move you that the Abundance plum be placed on the list.

MR. PEARSON—I want to hear from some one who has fruited it in southern Illinois.

MR. MENDENHALL—I object to a gentleman from central Illinois making a motion for a fruit to be put on a list for southern Illinois.

THE PRESIDENT—Mr. Pearson wants to know whether anybody in southern Illinois has fruited or not, and if so, for how long?

MR. PERRINE—I second the motion, for this reason; I know of Mr. Beal of Mount Vernon who has fruited it and likes it very much. I have been in his orchard and have seen it but not in the fruiting season; but he thinks it is worthy of propagation.

THE PRESIDENT—The motion to put the Abundance plum on the revised fruit list for southern Illinois is now before the house and we think the southern members only should vote.

Motion lost.

MR. PERRINE—I move that the Early Harvest blackberry be added to the list.

MR. FRY—I move that they add the Lucretia dewberry, as I think that one of the most profitable berries.

MR. PEARSON—I second the motion as to Early Harvest and think we had better vote on the amendment to add the Lucretia dewberry.

Amendment and motion lost.

THE PRESIDENT—We will now hear the report of the special committee read by Mr. McCluer.

Mr. President:

Your committee to which was referred the report of the secretary, except that part referring to finances, submit the following:

We believe that it is not advisable to establish life memberships of this society at a rate less than the present. There are several reasons. A man who has not enough interest in horticultural work to renew his annual membership annually at the present price, would not likely be of permanent value to the society. It is the experience of many organizations, that life membership, in a few years, becomes an obstacle to obtaining new members. If it should happen that the society should be thrown on its own resources, life members, whose membership fee had long since been used up, would either have to again contribute to its support or become a dead weight.

In regard to permanent place of meeting, it is the opinion of your committee, that it would eventually lead to overshadowing local membership and so make it practically a local society, with those from a distance taking the place of visitors, unless some method different from the present should be adopted for the election of officers.

In the case of exhibits and premiums it would lead to local members making arrangements regularly for taking the premiums, as has been seen in many fairs, where it soon comes to be a question, year after year, between a few men in the vicinity close about.

G. W. MCCLUER,
J. M. PEARSON,
T. E. GOODRICH. } *Committee.*

It was moved, seconded and carried, that the report of the special committee be accepted.

THE PRESIDENT—The secretary will now read the next question.

QUESTION—*What are the prospects for a crop of small fruits for 1895?*

Mr. Perrine of Centralia being called upon to answer, replied as follows: I have visited different sections in our vicinity. At Walnut Hill, they plant much small fruit; they are planting more than in the past, but it is in rather poorer shape than usual, owing to the severe drouth of the past two seasons. At other points, Irvington and Sandoval, there are a number of excellent patches. In Centralia the plant is smaller than usual but there are a number of excellent patches, and they are in very good shape. The drouth injured a small amount to a certain extent, but where the culture was thorough and conditions favorable, the injury was not so marked. I think that in all that section, in the central and southwestern portion of the State, the small fruit crop will not be so large next year as for some years in the past, and, that being the case, we will get better prices. The plant has been reduced considerably, especially where the people have to depend on express rates, so we may look for not so large a yield next year; but where the patches are good we think the yield per acre will be excellent the coming year. Some kinds of small fruits they are not so much interested in, and, in fact in southern Illinois, in our section at least, they are not planting small fruits as much as they should. I should say that it is about one quarter of what it was in 1889. It may be more, but that is just a guess. It may be one-third only—certainly very much less.

MR. HARTWELL—The present setting in northern Illinois—this year's setting—looks as well as they ever have, and the fields where we attempted to renew them look possibly better than ever, where they are cared for. The strawberry looks better than for years.

MR. PERRINE—We planted the strawberry last spring and notwithstanding a severe drouth it was one of the best patches we have ever grown. The rows are small and the plants not very thick.

Adjourned.

AFTERNOON SESSION.

Wednesday, 1:45 P. M., the meeting was called to order.

THE USE OF FERTILIZERS IN FRUIT GROWING.

H. L. DOAN, JACKSONVILLE.

Mr. President:

Profitable fruit culture cannot result from idleness or negligence, and the subject of this paper is one of the most important that presents itself to the grower. Keeping up the ground by fertilizing must be done to get the best results. All experiments show that extra culture is far more profitable than what is generally termed good culture; by this I mean that deep plowing and subsoiling should be employed, with a liberal supply of enriching materials, if the best results are to be obtained. Deepening the soil is not wholly for the purpose of furnishing more plant food nor to facilitate the downward growth of roots, but it is principally for the purpose of disintegration and making it of such a consistency that it will be capable of retaining a sufficient amount of moisture at all times to nourish and supply the plants growing therein, but not enough to be detrimental. Rain water, as well known, contains gases that are beneficial to plants, and if the soil is in a condition to allow it to pass through it, a large portion of the gases will be retained; but if the surface is hard the water either runs off or remains until it evaporates. All plants require food, and it is evident that if it is not in the soil it must be placed there, or no satisfactory results will be obtained. There are several ways in which this can be done; one, by plowing under green crops, either rye or clover. We generally get the ground which is to be planted well set to clover the year before, giving it a good top dressing of manure, during the winter, which is thoroughly harrowed in the spring before plowing. I have taken old worn out land and by this means brought it up to a point of production for profitable culture. A good deal depends upon the quality of the manure used in the topdressing. I hauled for this experiment from mule pens, there being little straw, loads weighing about 1,800 pounds and applied directly on the ground so there was no loss in heating. Another piece was planted in rye, making a heavy growth before winter; this was topdressed heavily with coarse strawy manure and plowed up late in the fall, about the 5th of November; this was fairly productive, but not up to the first manner of treatment.

In the third experiment the ground was plowed in the fall and then heavily manured with cow manure from a dairy where it had

been piled a year; this was set out in black raspberries, with good results. I often have well-rotted manure thrown between the rows of strawberry plants in September, straddling the rows with a wagon and doing five rows at a time; have found this beneficial and remunerative. Have also mulched in between the rows with coarse manure, but object to this plan on account of weeds. The best fertilizer I ever tried for strawberries is pigeon manure; this was put on liberally on two acres, and we had six successive good crops the fertilizer having been applied twice in that time. I have used slaughterhouse offal largely, but it has to be applied carefully, generally giving good results; for grapevines it cannot be excelled, the effect lasting for a long time, there being a good deal of bone in this material; have used fertilizers from rendering houses frequently, pounding it up. I can procure this fertilizer for $10 per ton, having to haul it only a short distance. I am going to apply this to my grapevines this spring. On one plot of strawberries planted this year I used ground bone with potash. On another, sea fowl guano. Can report results of this next season. Have used nearly everything in the way of fertilizers for land, as it is a hobby with me and I have been riding it hard and steady for twenty-five years. Most of the large manufacturers of fertilizers have special manures for the different crops. I tried Bradley's potato manure this season, scattering in the open furrows before planting; this gave good results, improving the yield in size and particularly in smoothness of potato. Of course stable manure is one of the best and greatest fertilizers, but it is not always obtainable and introduces many foul weeds into the soil; so for many kinds of crops commercial fertilizers are to be preferred. In some cases they are much cheaper than stable manure, especially if one has to buy the manure. The labor of applying fertilizer is nothing compared with barnyard manure. The food of plants consists of a number of elements, including nitrogen, phosphorus, lime, magnesia, iron, silica, potash, etc. A sufficient quantity of all these necessary elements except nitrogen, phosphoric acid and potash exists in nearly all agricultural soils. Nitrogen is nearly always deficient, phosphoric acid usually, and potash often. In some soils there may be enough of all the elements of plant food except one. Let us assume that this one is nitrogen. In this case the growth and yield of the crop will be limited by the quantity of nitrogen it can obtain. There might be an abundant supply of all the other elements, but the plants could not use them without nitrogen. This would be true of any one of the other elements that might be deficient. The plants must have them all at the same time, to develop in perfection. Nitrogen is one of the elements that is nearly always deficient. This is due to the fact that nitrogen in a soluble

form is easily washed out of the soil, while phosphoric acid, potash and the other mineral elements will not wash out.

The question is, how can I supply plants with nitrogen, phosphoric acid and potash in the best forms and least expense. We will take first phosphoric acid. There are two principal scources of phosphoric acid, bones and rock phosphates. Of these, rock phosphate is the cheapest source. The largest deposits of rock phosphates exist in South Carolina and Florida. These beds are supposed to be composed of the petrified bones and excrements of extinct animals. They are ground and mixed with sulphuric acid, and being thus treated become chemically known as superphosphate of lime. A good sample contains fourteen per cent of soluble phosphoric acid. The cheapest sources of potash are muriate of potash and wood ashes. Wood ashes, if unleached, contain from three to five per cent of potash. They also contain from one to two and one-half per cent of phosphoric acid (insoluble). They are worth as plant food from $7 to $12 per ton, according to the amount of potash and phosphoric acid they contain. Nitrogen is the most important, expensive and effective element of plant food, and at the same time is the one that is generally deficient in the soil. There are a great many sources of nitrogen, such as sulphate of ammonia, which is obtained during the process of making gas; dry, ground fish, cotton seed meal, dried blood, leather scraps, etc. But none of these furnish nitrogen in the form in which it is taken up by plants, namely nitric acid. Nitrate of soda furnishes nitrogen in its most available form and furnishes it at a lower price than almost any other source. This is found in Chili, South America, in vast quantities. Nitrate of soda as exported contains about fifteen and one-half per cent of nitrogen. One gentleman writing as to the effect on peach trees: I applied nitrate of soda at the rate of 250 pounds to the acre. The result was most gratifying.

The nitrate exhibits were shown at the World's Fair in the Nursery section in Midway Plaisance, showing the effects of nitrate of soda on growing plants.

The New Jersey Experimental Station analyzed one hundred and ninety-five different samples of brands of complete fertilizers that sold for $34 and $36 per ton and only contained plant food worth $15 and $17. But they were not all as bad as this. The average of all brands analyzed was as follows: They contained 2.74 per cent nitrogen, 7.70 per cent available phosphoric acid, 4.5 per cent potash. The selling price was $34.23 per ton and the actual agricultural value $25.66 per ton. That is, you could buy in the open market the same amount of actual plant food for $25.66 that cost $34.23 in the form of complete fertilizer.

The forms of nitrogen used in all commercial fertilizers are

dried blood and the nitrogen of organic compounds like bone meal, or cotton seed meal.

It is economy to apply manure liberally. Muriate, or sulphate of potash should be put on the land at the rate of 500 pounds to the acre the first time on fruit plantations, followed each year by not less than 250 pounds. Phosphate, rock or bone dust at the same rate. Wood ashes should be spread twice as liberally. Nitrogenous substances should be sparingly used as there is danger of injury to both seeds and plants. Dried blood is especially dangerous; the greatest care should be taken to mix them with the soil. It does not matter much at what time of the year the barnyard manures are applied, so that it is not neglected. I prefer fall or winter and have it plowed under as soon as scattered. Commercial manures act quickly, and just before growth is a good time to apply them.

DISCUSSION.

MR. SHAMEL—I would like to ask if these commercial fertilizers have been applied profitably to northern Illinois where the black loam is two and three feet deep?

MR. GUILFORD—I have not had any experience in Illinois, but Professor Wilson has tried three or four kinds of fertilizers on his farm, as the gentleman here described; he put on the usual amount for what they call beneficial effects, but could not see that he reaped any benefits whatever. The crop was just as good without it. That goes to show the fact that a crop cannot take more than it needs If the soil is rich enough, you can't do anything for it.

THE PRESIDENT—Has anybody had any other experience with those, as they are found in central Illinois, Iowa, etc.? Has anybody had any experience with fertilizers in an old orchard where the trees are starving?

MR. KELLOGG—I want to call attention to the commercial fertilizers they use for top dressing. They don't do any good unless they assimilate with the soil, and many failures come of not having them assimilate. It ought to be put on early in the spring and thus have time to dissolve the ingredients, and you must have rain in order to wash them into the ground.

MR WASHBURN—I have had some experience in using commercial fertilizers for growing vegetables, and while most of our fertilizers have been stable manure, still, to give the crops a good,

vigorous send off, I use guano and some of the commercial fertilizers that are made; also some refuse from our packing house, pork packing establishment, and have had good results, when applied in connection with setting out the plants, especially in the case of cabbage and beets. I live in central Illinois where we have that deep black soil which has been referred to.

MR. HERRICK—I have used the nitrate of soda on cabbage, but never used any of the other fertilizers. I find it is beneficial in raising early vegetables. It is all right for sandy loam.

MR. AUSCHICK—I have used the nitrate of soda on onions and radishes. There is one thing I should like to have answered. How can a man tell what fertilizer his soil needs, or what substance is best for it. There is no way of finding out what fertilizer he needs.

MR. MCCLUER—The only way is to try it.

MR. JUDD—What is our experiment station for, if we cannot find out from there these things we wish to know?

MR. GOODRICH, Union Co.—Where I formerly lived, in New Jersey, where the soil is sandy, we would take wood ashes and sow broadcast over the ground; but this cannot be done in my part of this State. Our soil has plenty of ashes already in it. It is a wood soil and does not mix with the nitrate; but take some other fertilizer, such as the bone, and the phosphates made in Chicago, or take Castoria and sow that and you will see good results, but never with the nitrate of soda. I got some of it. I was foolish enough to send all the way to Chicago for it and it did not pay the freight. I would hardly use it for it. Nitrate of soda is said to be very beneficial, but I should rather use something more simple and less extravagant. You have to settle it for yourself.

MR. DOAN, Morgan Co.—Probably the trouble was your soil had plenty of nitrate of soda in it; perhaps it is a citric soil and some other fertilizer would have been better, such as potash

MR. AUGUSTINE—Mr. Doan's experience is in heavy prairie loam.

MR. DOAN—No. In a clay soil.

MR. GOODRICH—Give your experience with nitrate of soda?

Mr. Doan—Bone dust does better with me than anything else. I am trying now a preparation of bone dust. Ashes are good, hard-wood ashes.

Mr. Shamel—Do you not have a sandy soil in some parts of your county?

Mr. Doan—There is no sand where I am.

Mr. Washburn, McLean Co.—I have tried the wood ashes in our sandy soil and have never seen that it does any good. It is no good there where we live.

Mr. Morrill, Michigan—If the subject has left central Illinois, I would like to speak in regard to wood soil. I am in the heavy timber land and have both heavy soil and light; and one part has to be turned and another is sandy with black loam on top. It is an ideal soil; we think it is the finest. Couldn't say whether our largest crops are produced with wood ashes, but it shows a wonderful effect, and bone particularly gives excellent results in fruit. I have tried all the fertilizers there are, and sometimes the experiment has been a little heavier than I wished. I have come to the conclusion that nitrate of soda does me no good. I have used Peruvian Guano. I have bought from Armour and Lester in Chicago, very pure bone, from which all the glue and grease had been extracted, and they gave me good results in peaches. In regard to complete fertilizers, wood ashes and bone could hardly be considered so, from the small amount of ammonia. After several experiments we have settled down on the best bone dust and ashes; we buy all we can get.

Mr. Doan—What do you find with regard to patash?

Mr. Morrill—It is so difficult to get into shape. I pay $10.00 a carload, at the mills, and freight for my ashes, and they are delivered at the gravel pit siding near one of my farms. They are hard wood ashes right from the furnaces, and it is cheaper than potash. Professor Bailey was there and took some notes of the effects he noticed from potash, and it was a revelation to him. Perhaps I may speak of an experience I had. I had run out of fertilizer, and there were four rows left of each of the varieties; in bearing there was no noticeable difference until about the time of ripening, and those all had to be thinned, and we had peaches to pick off of each. They

came out about alike and when they began to mature these four rows began to slack up a little as compared with the others. Instead of a delicate bloom it was a color which I did not like.

Professor Bailey came over there and we had a terrible storm. We were going to commence picking the next day. We went out and when we got to those four rows that had not had any fertilizers on them, the ground was literally covered with peaches driven into the sand; but when we got to the rows which had been fertilized we would not find half a dozen peaches to the tree on the ground. Without any further application that orchard has borne two crops since. As a matter of fact the part that was fertilized is worth three times as much as the other part. Professor Bailey and a professor from Indiana were there and they said it was a wonderful illustration of the effect of bone and ashes for peaches.

MR. GOODRICH—That is the point I was making, that in sandy soil ashes are much better. Mine has but very little sand in it. The experiment given by Mr. Morrill would seem in favor of ashes.

MR. MORRILL—I am careful about putting ashes on hard soil; where the nature of the soil is hard if you will put on the bone and ammonia compounds it is much better.

THE PRESIDENT—The next topic is the best method of planting and growing an apple orchard. The secretary will please read the essay on this subject to which was awarded the second prize. Upon comparing the numbers we find that Mr. G. W. McCluer of Champaign took the second prize.

SECOND PRIZE ESSAY.

THE BEST METHOD OF PLANTING AND GROWING AN APPLE ORCHARD IN ILLINOIS.

G. W. MCCLUER, CHAMPAIGN.

The first thing to do when you want to cook a hare is to get the hare; and so the first thing to do when you want to plant an apple orchard is to get the trees. The place where trees are to be bought is not of as much importance as is sometimes supposed. The most common advice is to purchase home grown trees; and as a rule this is the best thing to do provided your home nurseryman grows first-class

trees. If he does not it will be best to send to some one who does. Do not buy of tree agents or dealers. It will be economy in every sense to buy directly of the grower. It will generally be found advisable too, to buy more trees than are wanted and throw out the poorest ones, since there are few nurseries that are as careful as they should be in grading.

The tree must be more than merely the top. It must have good roots as well; and so the idea of a good tree would include careful digging and proper protection from exposure afterwards. The less the roots are exposed to the air the better for the tree. But as trees are packed by careful nurserymen, there should be no more exposure from shipping a thousand miles than from hauling five miles in an open wagon.

Trees when bought should be free from harmful insects. The only thing that is specially common on nursery stock and which can not be readily seen and disposed of is the root aphis. This insect is very common in many nurseries. It can be detected by the knotty or warty appearance of the root if the insect itself is not present, and may be easily destroyed by dipping the trees for a few minutes in a 5 per cent kerosene emulsion.

As a rule I should prefer to buy trees in the fall. This would be especially true if the trees are bought at the home nursery. For the central or northern part of the State it will usually be best, when the trees are bought in the fall, to heel them in carefully and plant in the spring as soon as the ground is in good condition to work. For much of the southern part of the State, it is likely that fall planting will be best if the ground can be had in good condition.

The act of taking up and transplanting a tree makes it more liable to fall a prey to insects, fungous diseases and severe weather, either cold or hot, wet or dry. If it were not for this, fall planting would always be preferable when the ground can be had in good condition. Trees dug in the fall and either planted or heeled in, will have their roots healed over and will often be found to have made good young roots before time for planting out in the spring.

For the man who wants to grow a few apples for his own use, it is not of special importance to speak of apple growing sections. He must use the land he has. As good a rule as can be given him would be to plant where the orchard will be most convenient, with but little reference to anything else. While it is well enough to advise high land or north slopes, one place, on most of our farms, is apt to be about as good as another and convenience is the most important object.

To the man who is going into apple growing as a main part of

his business and has not already a place to which he is tied, location will make a decided difference. While it would take too much time to discuss this point in full, it might be well to note the behavior of the same variety as grown in different places. The Willow, on our rich level prairie land, is a green colored apple, sour, scarcely eatable until cooked. As grown on rougher land in some places, it is almost as highly colored as the Ben Davis and of excellent quality. The Winesap of extreme southern Illinois is a fine apple of good size while in most of central or northern Illinois, it is small and of comparatively little value. Before planting an orchard in a locality, find out what has done well there and be governed largely by that. A locality that already has an established reputation, will be found to have its advantages.

It is often said that "any land which will produce good corn is good enough for apples," but it does not follow that the best corn land is also the best for apples. Land for an apple orchard should be fairly rich and well drained. Before planting, it should be well prepared by cultivation. I have seen orchards planted in sod ground and afterwards do very well, and others planted in well prepared land and soon die out. The care after planting must be of the right kind and be given at the right time to be successful.

Distance apart for trees will depend somewhat on varieties and location. Trees of some kinds will not only grow larger but last longer than others and they will last longer in some localities than in others. The rule that is generally given is perhaps as good as any. Plant from thirty to thirty-five feet apart each way.

The best orchard I have seen was planted in rows that were perfectly straight. There is a close connection between straight rows and good healthy vigorous trees. The man who has pride enough in his work, and care enough to get his rows straight, will be the more likely to have pride and care enough to give his orchard the attention it needs afterwards.

If the ground for planting has been thoroughly prepared it will not be necessary to dig holes more than large enough to give room for the roots without bending. If the ground has not been well prepared, the larger the holes are dug the better. I prefer to throw out the dirt considerably deeper than the tree is to be set and fill up to the required depth with surface soil.

The tree should be leaned somewhat to the southwest, both to allow for the after effect of the southwest winds and to protect the tree to some extent from the direct rays of the sun. The dirt should be packed carefully and firmly about the roots, and for this there is nothing equal to the fingers. Water should not be used, as it almost always tends to harden and bake the soil and make it more liable to dry out.

If trees could be had with what might be called ideal roots I should set them as near as convenient the same depth they grew in the nursery, because the roots have already adapted themselves to some extent to the depth required for getting their food. But with trees as we get them I should generally prefer to set them about four inches deeper, because that gives them a better hold on the soil and they are less liable to be blown over by winds.

In pruning the young tree, my own idea is to have a central leader with three or four branches coming out from this at about two and a half feet from the ground, and cut these back to about half their length or less. The pruning afterward I should generally limit to preventing crotches, taking out suckers and branches that cross and rub each other. But I do not believe pruning is so much a matter of what you shall do, or what you shall not do, as of having a definite plan in mind and following it out. Some of the most successful orchardists of southern Illinois prefer to have their trees branch out at once without a leader. Many farmers are afraid of injuring their trees by pruning, but the fact is it is not the regular light pruning that does harm, but the occasional heavy pruning. After the first few years nature prunes her trees lightly but regularly every year, taking out the weak, crowded or overshadowed branches.

The work of insects must be guarded against, but it will be impossible to mention all of them here. Perhaps the worst pests to the orchard are the two borers, the round-headed and the flat-headed, the latter being the more common. This borer probably kills more transplanted trees than any other one thing. Its eggs are usually laid during June and July along the southwest side of the trunk of the tree, from near the ground up to the branches. By washing the tree a few times during the egg laying period with weak alkali the eggs may be killed. If the borers get into the tree they should be dug out as soon as noticed. They may be found by watching for the sawdust-like material which they force out from their burrows.

The young orchard should be well cultivated. To do this it is not necessary or best that the ground should be kept bare. There is no reason why a partial crop of corn, potatoes or beans may not be taken from the ground each year until the orchard is old enough to come into bearing. It is not the best practice to leave the ground bare during the winter. Land that has some coarse mulch on it will be found in better condition in the spring than that which has none. Such crops as wheat, oats or grass are very injurious to the orchard at any time, and especially when young; but as it grows older it may be in clover for a short time without harm. In gen-

real the cultivation should be shallow and the land kept as near level as is convenient. After the orchard has reached some age, a liberal application of manure will in nearly all cases be found very helpful to the health of the trees and so to the fruit.

It will not do to count on an orchard lasting indefinitely. The farmer often thinks when he has planted an orchard it is done, not only for himself, but for his children, too. The fact is that the average profitable lifetime of an orchard is not more than twenty years; and so, when the owner begins to think his orchard is at its best, it is time for him to plant another. The trees not only die out, but the fruit of young orchards is better in every way than that from old ones.

DISCUSSION.

MR. PIPER—My plan is somewhat different. I use a plow first. I measure off the land and then use a plow—plow just as deep as I can to open out the rows for setting; don't care if I go a foot and a half, and the last time plowing through I get my furrows about twenty inches or probably more, and then I take a hand marker and mark it right across as I would for corn. I dig down and make the ground muddy at the roots. I have two boys carry the trees and drop them down there with just enough soil on their roots to hold the trees in place, and then tramp them just enough to hold them there, and go on through in that way. Two men and two boys and myself have set 640 trees from 1 o'clock to 4 o'clock. When I get the trees in place I take the plow and throw the soil back in place. They grow as if they had not been transplanted. There is an easy remedy for borers in trees. Take hard soap or soft soap and wash the trunks of your trees, and my word for it there will not be a borer touch the trees. I do that once in a season and the trees will shine as though they had been polished or varnished. I practiced that a good deal and I never had any trouble with borers. Still, you want to be particular not to get it on the branches.

MR. BOBINETT, MO.—In speaking of digging holes for trees, a great deal depends upon the kind of soil as to the size of hole you should dig. If he has a subsoil of clay that will hold water, and he digs a hole much deeper than the tree roots, it will not do. That will

hold water in our country where I am located, and we have lost more trees by digging too deep than in any other way. You want a hole just as near the size of the root as possible, and then put back the same soil as near as possible to that rich soil on top. As for keeping out the borers, I use a wire gauze and never use a wash. Just as soon as I set the tree out I wire it, and I have no trouble with the borers.

THE PRESIDENT—How expensive is that and how do you do it?

MR. BOBINETT—It costs $1.05 a hundred square feet. The first five years it costs about two cents a tree, perhaps a little over that. It is not necessary to have it very high, for the rabbit, if he finds the wire there, will leave it, and the beetle will not crawl very high up. I leave it there till it rots off. As to setting them, it would be all right to dig a hole in a sandy subsoil, but you cannot dig a post-hole in soil that will hold water for four, five or six days.

MR. MINKLER—It is the simplest thing in nature to protect your trees from rabbits and mice. When I set a tree I take and put a six-inch tile over the top of my tree, and then I fill in my tile with earth up to the top of that. Then you take any old sacks you have around the house, or old carpet or oilcloth, and tie it down to the bottom of the tree; then you wind it around the tree until you get it up to a proper distance; then tie it there, and it sticks for all time so far as that is concerned. Then your tree is protected from the winter sun. That is what kills your trees; it is not the summer sun. It protects your trees from sunscald and from the insects, and it is there permanently. And you take a strong lye just as the buds are coming on. I don't care how strong the lye is. I have tried the experiment and sprayed the tree. I boil the lye down until it is what the grocers would call strong enough to cut the plume off a feather. Then we calculate it is strong enough to make soap. I have tried that in the nursery when the tree was one year old and two years old, and it will not do at that age; but it does not affect the three-year-olds, and from that age on up it is all right. You spray it and see what the effect will be. It is the simplest way.

MR. CORBIN—In setting the trees in the fall, you should be careful to wash them in coarse lime and wrap them with building

paper. We find this better than waiting for spring to set them. In the fall the ground is in better condition to work. In the spring it is commonly wet at the time the trees ought to be set.

Mr. Mann—I noticed a vast difference, in these essays, in the method of preparing the hole for the tree to go in. They were twenty in number, and I believe almost twenty different ways of making the holes. One man said he made it with a spade and didn't see why anyone should make it differently. I wonder if there is not more in that than we think. If there is such variety in soils there may be as much in making the holes. One man said he was in favor of putting in dynamite and blowing out the hole to put the tree in.

Mr. Soverhill—I think it is a good plan to begin in the fall to prepare the ground for an orchard. As this gentleman said, we should plow in lines and plow two furrows, say fifteen or twenty inches, or two feet deep, and then you have no holes to dig to set the trees; then in the spring go over that and make it mellow and set the trees level, and you have a perfect ground. Just put enough dirt around those trees to hold them in place; then take a team and plow two furrows and roll the ground up to it. Then you have got perfect ground all around the trees, on each side and up to them.

In regard to getting them straight; I take a line and draw it straight across the field and begin beyond the line and set each tree and move the line right along exactly for the next. I can set out an orchard with just one helper in one day. I set out six hundred trees some years ago and every one is perfect. I never have to protect from the rabbits. My prevention is to go along every fall and plow two furrows, then take a spade and dig up the scraping from the barnyard and throw it around them, and the trees are protected from the mice. They won't touch them. I think a man ought to plant something in his orchard every year—corn, or something else. If there is a cornshock standing there the rabbits won't touch the trees. You must leave the shocks standing around. Then they won't go to the tree.

Mr. Kellogg—My farm is surrounded on one side by a thick growth of trees, and the rabbits are very thick. They got in among

my young pear trees and I got some asafœtida and made a wash, about like a paste, and washed the trees. It is mixed with whitewash. I do it every fall. Ten cents' worth of asafœtida will wash three or four hundred trees. Just take the whitewash brush and put it on and then let the trees alone. They never trouble them except in winter.

Mr. Powell—If you undertake to set trees in the fall, in some localities, you would miss it very much. From my experience, I should advocate setting trees in the spring. If you set them in the fall you have to be very particular to protect them until spring, so they wont be injured. One reason why they do not do so well, is, that during the cold winters we have, the trees have made no growth and the roots have not started enough to benefit the tree and the sap is not in circulation. The tree becomes weakened.

Mr. Morrill—There have been two or three methods suggested here that I should like to see pass our society with caution; one in regard to washing and one in regard to wrapping. That has been a source of discussion in our State. When a man recommends a wash to be applied to a tree, we want to know what he means. The gentleman on my left here says we should put in lots of salt. Now salt is one of the most dangerous things. You will remember that J. H. Hale recommends a wash for borers, for peach trees, of carbolic acid, potash and whitewash. Two gentlemen came over there who were growing a good peach orchard; they had tried everything but that, and, when they saw it over J. H. Hale's name, they thought it was all right. They went to Chicago for pure potash, pure carbolic acid; they wanted fresh, pure ingredients; and they put it on and lost every tree. They wrote to Hale and asked him to answer. He replied, "I think you must have been too particular to get your materials pure. We use what we buy at the grocery, while you bought pure carbolic acid."

Another man recommended a solution having lye in it. Two men went home and put it on their peach trees, and the leaves were coming out, and the leaves came off entirely. Now we have various kinds of building paper. If you use paper with tar in it on trees, it will kill them. The common building paper we have has tar in it. A certain amount of caution ought to go with all this.

In regard to the protection of trees; I worked for a man is Missouri who, I believe, had the best success in protecting trees—apple trees. He set out a young orchard and the rabbits were very bad there. He would take a handful of cornstalks and tie them around the tree and leave them there until the next June, and the rabbits never disturbed the trees.

Mr. R. T. Fry then read the following paper:

MY EXPERIENCE IN SPRAYING FRUIT TREES.

R. J. WALKER, GRIGGSVILLE.

Mr. President:

It seems to fall to my lot to tell you something about my experience in fighting insects and fungus in an orchard. As this is my first attempt and as I am not an educated man you need not be surprised if I make a blunder of it. I hope you will be content if I tell you in my own way my experience.

In about 1848 I planted 200 apple trees; 40 of them were root grafted and 160 were two-year-old seedlings. When they had been planted one year I stock grafted the seedlings and got the grafts to grow in every one of them. I also put a scoopful of ashes about the root of each tree to prevent the borer beetle from depositing its eggs in them, and I never found a borer in one of the trees so treated. I cultivated my trees, plowing the ground each year until the trees began to bear, when I seeded to clover. The year it was in clover the trees all blighted with leaf blight, so I plowed up the clover and planted corn and other crops and I found that where I plowed every year, especially if done late in the fall or early in the spring, that the curculio was not so bad, and when left unplowed they were much worse, so I concluded to plow if I didn't raise anything but weeds. When my orchard was about sixteen years old it was sowed to clover again and my apples got the bitter rot so bad that I had no good apples. I turned the hogs in and let them eat what apples and clover they would, and plowed under the apples and clover in the fall. The next year after plowing it up I had a good crop of fair apples, free from curculio, and the leaves and fruit were bright and fair.

The first trees to fail were the root grafted trees, some dying out at fifteen or twenty years and all were gone before the stock grafted trees began to fail. I planted another orchard and cultivated it ten years, then seeded it to clover, and the next winter we had a heavy snow and a hard crust, and the mice were very bad and they barked three-fifths of the trees, and the curculio was very bad, so I plowed up the clover. I found in that patch, as in others, that curculio and

fungus are worse where the ground is not plowed, and after it is plowed they are not so bad, so I adopted the plan to plow if I did not raise anything but weeds. A friend of mine once told me he would have been better off if he had not had an apple. He had not trimmed, nor plowed, nor sprayed and his apples were as black as tar with a black fungous mould and so badly stung with curculio they would not sell for anything. His orchard was in blue grass. My orchard of same age was plowed every year and the apples sold for a good price, all fair and bright. I find, by plowing, that I keep my trees thrifty and the foliage bright. The best Janet apples I ever raised was on thin bluff land, well cultivated and with a liberal coating of wood ashes applied.

Some seven or eight years ago I commenced to spray for the codling moth and leaf eating insects, with fairly good success. I spray with London purple, five ounces to fifty gallons of water. My arrangement for spraying is to use two or three barrels laid on their side in the wagon, then put on side boards and a platform on top to stand on, with one man to drive and one to pump; with this outfit we will spray ten acres of orchard each day. This year, 1894, we sprayed about two-thirds of my orchard and the material giving out we left the balance unsprayed, with the following results: From the sprayed portion of the orchard 400 barrels of number one fruit and 200 barrels of number two; while from the unsprayed portion we had no number one fruit at all. I also find that some others report the same result. It pays to spray.

I spray the first time as soon as the bloom falls, and the second time ten days or two weeks afterwards. Then in June I put paper bands around the trunk of the tree to trap the codling moth and thus prevent their depredations later in the season when too late to spray. I find the life history of the codling moth is about like this: The moth lays an egg in the blossom end of the apple, the egg hatches, the worm eats its way to the core, comes out at the side of the apple, spins its thread to the ground and starts for the trunk of the tree to hide, like a silk worm, under a scale of bark or any other good hiding place and changes into a chrysalis, and stays there three or four weeks and comes out a moth to lay more eggs in the apples late in the summer. The paper bands are a necessity to prevent the late brood. The bands are made of common strawboard building paper two and one-half inches wide, nailed or tacked around the trunk with a three D nail. The bands and nails cost one-eighth cent each, large enough for a tree ten inches through. I find that if I put on two bands, one above the other, the moth always stops at the first good place he finds. I also make boxes for birds such as bluebirds and wrens. I make them four inches square inside measure and place them in the orchard Sixty boxes had fifty-nine nests in them in one year, and it takes a good many insects to feed fifty-nine nests of young birds and their parents. The boxes cost me three cents each.

I also find that sometimes a tree will take what we call black blight and will die, sometimes, a limb at a time, and if replanted the replant is apt to die the same way. I find the best way to fight this disease is to grub the tree up by the roots and burn it in the hole where it grew and thus kill the germs of disease left in the ground, or apply plenty of ashes and fresh dirt; but burning is the best.

In spraying my plum trees I use kerosene emulsion, spraying three times with good results. I sprayed three cherry trees and four plum trees with the emulsion, then two cherry trees with London purple. The trees sprayed with London purple were badly stung with curculio, those sprayed with the emulsion were sound and free from stings. They were all sprayed at the same time. The way I make the emulsion is as follows: I take one part kerosene, one part soft soap and twenty parts rain water. Have part of the water boiling hot and mix, then add the balance of the water and mix good. The women spray their flowers and house plants with it. It will kill bark lice on trees and cactus, cabbage worms, or any kind of insects that it touches, even grasshoppers.

The worst thing you can put in an orchard is timothy, and the blue grass is next; for where the ground is in grass it makes such a good hiding place for curculio, and the fruit is always small; and even clover makes a bad harbor for mice, but if you "hog" your clover the hogs will kill the mice and rub against the trees and stink the curculio out, both in the apple orchard and in the plum patch.

I find it to be a good plan to spray every year whether you have a crop or not, as some insects will live on weeds or grass; and it pays to plow if you have a crop or not, for then you are getting a good growth on your trees. I find that orchards not plowed have small apples and trees are stunted in their growth. It is a good plan to trim out all broken down limbs, for insects will hide in the splinters; also to burn all brush and trimmings, for that makes a good hiding place for insects. Therefore, *plow*, and *spray*, and *trap*, if you want good fruit.

THE PRESIDENT—We will pass the discussion for the present and take up the next paper, "Spraying to Prevent Diseases of the Foliage" by G. W. McCluer of Champaign.

MR. MCCLUER—I cannot say that I have followed the subject exactly as made out by the secretary but have taken a little different form.

FUNGICIDES.

G. W. M'CLUER, STATE EXPERIMENT STATION, CHAMPAIGN.

Mr. President:

The use of sprays to prevent injuries to plants, both by insects and fungous diseases, has become one of the regular things with the more progressive fruit growers, and though not all who have sprayed to prevent rots and mildews have succeeded, so many have reported success, that it is not to be doubted.

In order to combat a disease intelligently we must know something of its life history, and especially when it begins to work. But it would make a paper like this too long, to undertake to go into details. So if I say spraying should begin as soon as the buds begin to swell, it will be understood that it is because the disease has been known to make its appearance soon after that time. It is always to be understood that these diseases cannot be stopped, but having once started, will continue to run their course in spite of sprays. The only cure would be to kill. Then we must know what things will effect it and how to use them.

The first of the fungicides used was the Bordeaux mixture, which was discovered to be a fungicide by accident. Since the discovery of the fungicide properties of this mixture, many other preparations have been tried with more or less success. But as a result of all the experimenting with different materials and formulas, it has been found that the Bordeaux mixture, in some of its modifications, proves more generally effective than anything else.

It has been found that in many cases, and especially where the outbreak to be resisted is not serious, a weaker preparation than that first recommended will answer every purpose. The formula which has become standard is six pounds sulphate of copper and four pounds lime to twenty-two gallons of water; and a recent writer (D. G. Fairchild) suggests that we leave the amounts of copper sulphate and lime constant and that we designate the different strengths as the twenty-two gallon formula, forty gallon formula, or sixty or eighty gallon formula; meaning all the time that there is in each of these amounts of water the same amount of copper sulphate (six pounds) and lime (four pounds).

In general the directions to be given in regard to spraying are not different from what they were four or five years ago, but the work that has been done since then makes some modifications of detail seem advisable. We have learned more of the limitations of the profitable use of remedies. The number of diseases known to yield to Bordeaux mixture has been somewhat increased and the rosy-hued possibilities have been a little dimmed. The main things learned are to begin at the right time, and what the right time is for some of the diseases. It is

entirely likely that when we know more perfectly, the life history of all the diseases, we may be able to control more of them.

For much that is contained in this paper, I am indebted to bulletin No. 6, for 1894, of the Division of Vegetable Pathology of the United States Department of Agriculture, which was compiled by Mr. D. G. Fairchild. The bulletin is entitled "Bordeaux Mixture as a Fungicide," and gives in brief the conclusions to be drawn from all the work done with fungicides both in this country and in Europe. I have not thought it worth while to speak of any of the other fungicides because as Mr. Galloway says "Bordeaux mixture is now more used than any other and there can be no question that it exceeds all others in cheapness, efficacy and harmlessness to both animals and plants."

APPLE SCAB

is well known to all and needs no description. It attacks the fruit, leaves and younger branches. The time of beginning its attack depends on the character of the season. It does not begin on a plant during weather that is continually bright and warm. The damp, disagreeable days seem to be most favorable to its starting, but after it is started the weather only determines whether it shall be confined to spots already attacked, or spread to new ones. It is now known that the disease may start on the fruit even before the bloom falls, so that for the greatest certainty, it is necessary to begin spraying before the blossom opens. If the disease once gets a hold, it cannot be killed out. The scab spots have been known to grow under a coating of the Bordeaux mixture.

The conclusion that has been drawn from a study of all the work done in this line is that there should in general be four sprayings for scab. The first just as the fruit buds are swelling; the second just before the blossoms begin to open; the third as soon as the bloom is all off, and the fourth about the time the fruit is a half inch in diameter. Any spraying after this is of doubtful value. Six pounds of sulphate of copper and four pounds of lime to seventy-five gallons of water has been found to answer as well as a stronger preparation.

BITTER ROT

of the apple is a disease that is quite common in some localities and to some varieties. The Willow and Snow are specially liable o be attacked. The disease is worse in the southern than in the central or northern part of the State. I know of cases where the two varieties named have been all cut out of orchards because they were no longer able to mature their fruit on account of this disease. The attempts made to control bitter rot have been only partially successful. It is recom-

mended to begin preventive treatment before the bloom falls from the tree, and make four sprayings at intervals of about two weeks. As a rule the rot does not show itself until the fruit has reached considerable size, but it is not certainly known when the attack begins, though it is supposed that its season may vary considerably.

Pear scab is a disease very similar to the scab of the apple and the same recommendations made for the apple scab would answer for the pear. Young pears, even before the blossom has opened have been noticed to be black with the scab, which shows itself more readily in the pear than it would in the apple, because the young pear is smooth while the young apple is covered with a thick down that would hide the disease of the fruit. Several preparations have been used on the pear but none of them have proved better than the Bordeaux, and if the same thing can be used in all cases, it will be found cheaper than to use a different thing for each ailment, even if the chemicals do cost a trifle more.

The rot of the peach, plum and cherry do not seem to have yielded very much to treatments so far made. All of the more common fungicides have been tried and even in the hands of the most careful experimenters have given no more than partial success. Mr. Galloway of the Division of Vegetable Pathology obtained only negative results. (His results have usually been as striking as those of any one else.) Chester of the Delaware Experiment Station found only about half as much rot on peach trees sprayed six times, beginning the last of April, as on those not sprayed. At our Experiment Station, persistent spraying of plums, both by Mr. Clinton and myself, failed to give any beneficial results. The disease lives over winter in the dead fruit either on the tree or on the ground and is supposed to live also in some of the young shoots that have been attacked

There is a decided difference in the liability of different varieties to this disease. The Robinson plum, which has set fruit more regularly and abundantly with us than any other variety, has been the worst to rot. It is so bad that fully ninety-five per cent of the fruit rots after reaching nearly full size. The Hale's Early, Alexander and peaches of that family are exceedingly bad to rot. Perhaps one of the best things to recommend is to plant something else.

The peach leaf curl is sometimes a very troublesome disease. I have known it to take off at least half the leaves from an orchard. It appears very early, attacking the first leaves of spring, and usually disappears early in the summer. Professor Taft of Michigan claims to have been entirely successful in controlling the disease, The treatment be begun before the buds open. One treatment as the buds begin to expand and another while the leaves are still very small are all that it is worth while to give. It is not worth while to try to fight the disease after it once begins to show in the distorted leaf.

More work has been done with the black rot of the grape than

with any other fruit disease. And while a few still report failure and while there are many other failures not reported, the great number of successes must be taken as conclusive that the disease can be very largely controlled. With this disease as with many others both the foliage and fruit are attacked, though it is the fruit we are most anxious about. The weight of recommendation in this case as in the others is to begin early. Make the first application before the buds swell, followed by two more before the vines are in bloom. The treatment after this must depend on the weather. If it is continually dry and bright no spraying will be needed; if the opposite, it should be repeated as often as the spray is washed off by the rains. Except in very bad cases it has been found that a mixture of sixty to seventy-five gallons of water with six pounds of copper sulphate and four pounds of lime answers every purpose and is much cheaper and easier to manage.

The downy mildew or brown rot of the grape is not so common as the black rot, and it is specially bad on comperatively few varieties as grown with us. Many kinds have it more or less on their leaves and not on the fruit. The Bordeaux mixture has been found by the majority of experimenters to be the best remedy, and the time of application and strength are practically the same as for black rot.

Treatment of the grape and the red and black raspberries to prevent anthracnose have not yielded either satisfactory or encouraging results.

The leaf blight or rust of the strawberry has been reported succesfully controlled by some experimenters and not by others. The amount of damage done by the disease is a matter of question. It does not make its appearance until the fruit is practically gone, and the only advantage to be gained would be to have the plants make a more healthy growth in preparation for the next year's fruit. There are many strawberries, and among them our best varieties, that are practically free from the disease and it would seem as well to select these for planting and let the rest go. *Save and propagate from the healthy and let the sickly one die*, would be as pertinent advice in plants as in animals.

The mildew of the gooseberry has not yet yielded satisfactorily to control. Some experiments have been partially successful with potassium sulphide. No one has reported success with anything else, though I understand that the experiment station at Geneva, N. Y., has had encouraging results with Bordeaux.

The rot that comes on the blossom end of the tomato has been reported controlled by the use of Bordeaux mixture by an experimenter in South Carolina in 1890; but as there has been no confirmation of this since, and as there has been so much attention paid to

the disease, the first and only success would seem to at least need proof. No one has reported success with any other remedy.

Scab is the disease of the potato most commonly noticed by the grower or consumer. Like all other diseases of plants, many theories have been advanced as to the cause. Usually some sort of an insect has had the blame. It is now conceded by most of those who can claim any recognition to authority, to be caused by one of the lower forms of plant life known under the general name of bacteria. It seems that the scab is most apt to be transmitted from scabby seed to the new crop; but the organism may live year after year in the soil and attack potatoes grown from seed that is entirely free from it. Some varieties seem, from our experience, to be more liable to the disease than others, but none are free at all times. The disease is worse some seasons than others, but it is not yet clearly known what relation there is between the character of the season and the development of scab.

In an attempt made by me at Champaign, about ten years ago, to control scab by soaking the seed in preparations calculated to destroy fungus or bacterial germs, no results were obtained. Since then, others have claimed to prevent the disease in great measure, by soaking the seed in various preparations such as Bordeaux mixture, corrosive sublimate, etc. Mr. Bolley of North Dakota has found very decided results from soaking the seed where the potatoes were afterward planted on new land. Mr. Clinton of our own station got very encouraging results the past season from potatoes soaked in corrosive sublimate and planted on soil on which potatoes had not been grown before within at least fifteen years. Of the substances used so far, corrosive sublimate (bichloride of mercury), eight ounces in fifteen gallons of water, has given the most satisfactory results. The probability is that rotation of crop, together with soaking the seed, will generally be found the best practice.

There are two leaf diseases of the potato, one of which ends with killing the vines, and so making the tubers stop growing without ripening naturally, and the other causes the vines to die and also causes decay of the tuber. In either case, the first indication is that the leaf begins to die. The time depends on the season and the condition of the vines. With us last summer the earlier and more vigorous potatoes began to show disease the latter part of May and it spread very rapidly on the early varieties, but did not attack the late ones. Both of these diseases have been controlled by many experimenters by the use of Bordeaux mixture and to a less extent by some of the other fungicides.

PREPARING THE BORDEAUX MIXTURE.

Probably the best way, where spraying is to be done regularly, is to prepare what are called stock solutions of both sulphate of copper and lime. By suspending the sulphate of copper in a basket or coarse bag in a barrel of water, one hundred pounds of it can be dissolved in fifty gallons of water, making a solution of which one gallon will contain two pounds. Only good fresh lime should be used. In slaking it, water should be poured on as fast as the lime will absorb it and it should be kept constantly stirred up from the bottom. When it is done it should be something like thick cream. If hundred pounds of this slaked lime be diluted to fifty gallons, then each gallon of the milk of lime so formed will contain two pounds of lime, and each gallon of the copper sulphate solution will contain two pounds of copper sulphate. Those stock solutions should be kept tightly covered and will keep for some time. The milk of lime should be thoroughly stirred up each time it is used from, as the lime soon settles to the bottom. It is recommended to dilute both these stock solutions before mixing and then to stir thoroughly after mixing. The Bordeaux should be used soon after it is prepared.

Unless the season is very unfavorable, or the outbreak of the disease is very bad, the Bordeaux mixture may be made of six pounds of copper sulphate and four pounds of lime to fifty, sixty, or even seventy-five gallons of water. This makes it much cheaper and more easily managed.

In preparing this paper I have taken the liberty of writing to a number of experimenters, asking for anything new that may have been developed recently. The following responses have been received:

After I had been asked to write on this subject, I wrote to a number of State Experiment Stations and asked them, if they had anything new on the subject, to send it, and I received responses from quite a number. It may be in order to read them here.

From Professor Jas. Troop, Horticulturist, Indiana Experiment Station.

The most successful fungicide I have found is the Bordeaux mixture for grape rot, apple scab, potato blight, etc., and potassium sulphide for powdery mildew on grape using the ammoniacal copper carbonate solution for the last spraying of grapes, and they give perfect satisfaction.

From Prof. L. R. Taft, Michigan Agricultural College:

I am satisfied that nearly all fruit crops, and many of the vegetables, can be profitably treated with fungicides. While we cannot

claim that copper sulphate is a sure specific and will give entire immunity, its effect in nearly every case, if applied in time, will be sufficient to secure the fruit comparatively free from disease, and by preserving the foliage in a nearly perfect condition, enable the trees to make a better growth than would otherwise have been obtained, and to form fruit buds for the next year's crop.

For the prevention of peach-leaf curl, raspberry anthracnose and strawberry-leaf blight, the results have been entirely satisfactory, as compared with check plants left unsprayed.

The first application, using copper sulphate solution, was made just before the growth started, the second as soon as the blossoms fell, and a third in the case of the strawberries and raspberries as soon as the fruit was picked, while the peaches were given a third spraying about two weeks after the second application. The peach foliage was quite free from leaf-curl, while on the unsprayed trees it caused many of the leaves to drop. The new growth of raspberry canes is quite free from anthracnose, although the old canes and new ones on unsprayed plants were badly spotted. The strawberry plants were all sprayed last year, so that the disease was not very troublesome upon the check plats, but a difference could be seen on the foliage in favor of spraying, and there was a still greater difference in the amount of fruit that dried up on the vines, owing to the presence of the blight upon the fruit stalks. I neglected to state that Bordeaux mixture was used for the second and third applications.

While I still recommend the use of Bordeaux mixture for the second, and perhaps the third sprayings, I shall, in the future, rely upon copper sulphate solutions where I have previously recommended some of the ammonia solutions. I find that it is even more effective, and that it can be used at the rate of 1-2000 or 1-3000 with safety upon nearly all plants. If to be repeated upon the peach I should make it 1-5000. I am now using it of the strength of 1-500 upon a variety of greenhouse plants, repeating it once a week, and as yet have seen no injury. When applied in a 1-500 solution some of the more tender plants, such as the bean, seem to be a little affected. I shall retain Bordeaux mixture as it admits of the use of arsenites without danger of burning the foliage, and because it remains a long time upon the plants.

I would urge that all orchardists provide themselves with a tank instead of bothering with barrels. A common stock tank with a cover, or better, a tank, such as is used by threshing engines, will enable one to take from ten to twelve barrels at a load, and thus get over the orchard much faster. One of the other advantages is, that the operator can stand upon it and thus be raised two feet higher than if in a cart, and five or more feet higher than when a stone boat is used.

The great increase in the use of insecticides and fungicides, and the probable increase in the use of the copper sulphate solution, demands that we be supplied with better spraying machinery. It is really surprising how many persons are spraying their orchards when we consider the vexatious delays one is often put to from the clogging of nozzles, the leaking of valves, of stuffing boxes, and the tipping over and breaking of the top-heavy pumps, especially when the work is left in the hands of the ordinary hired man.

It seems to me that we need in our spraying pumps the following:

1. All parts that can come in contact with the spraying solutions should be of brass.

2. The pump should set low in the barrel or tank, so that it will not trouble in driving under trees with low branches, or if the barrel is used, tip over and break.

3. It should have metal valves. The durability of leather or rubber valves when the pump is used in copper mixtures is short, and to replace them requires, at best, some time.

4. The pump should be so arranged that a stuffing box will not be required.

5. It should be provided with an efficient agitator. The return stream of water is unsatisfactory as the pipe often becomes clogged; it lets down the air pressure and uses a needless amount of force for the work it accomplishes, so that it is very unsatisfactory all around.

6. The pump should be simple in construction, not likely to get out of order, and yet readily taken apart in case repairs are necessary.

7. While a large air chamber is not necessary, I know of but few pumps that have them sufficiently large.

8. Every spraying outfit should have for each line of hose an extension rod of bamboo, brass or galvanized iron, sufficiently long to raise the nozzle well over the branches. It should have at the lower end a shut-off valve that can be closed when the spray is not to be used, thus preventing loss of material and holding up the air pressure.

9. While the pump should work easily, it should have power enough to throw a strong, heavy stream that will cover a large surface. Every farmer with five acres of orchard should have, and use, a pump sufficiently powerful to spray, in a thorough manner, three hundred apple trees of the largest size per day of ten hours.

10. The size and character of the nozzle should be adapted to the size of the pump and the work that is expected of it. It should be arranged so that it will automatically free itself from obstructions, or that the operator can do so without stopping the spraying.

It should break up the stream into a fine spray, throw it with force and distribute it well over the tree or plant. The man who brings out such an outfit will certainly be a benefactor to the fruit grower.

From Prof. W. J. Green, Horticulturist, Ohio Experiment Station:

1. We have materially checked the peach-leaf curl with the Bordeaux mixture, but as our experiments were not planned specifically with reference to that disease, we do not know whether the early or the late spraying did the greater good. We simply know that the treatment given in 1893 showed good effects in 1894.

2. In several cases, within the last three years, we have seen indications that spraying saved the apple crop from dropping early in the season. In 1892 some rows of Newton Pipins left unsprayed bore almost no fruit, while the sprayed rows on either side gave about half a crop. The same thing occurred in another orchard that season, and again in our own orchard this year, but a still more marked case came under my notice in another part of the State. Some Rome Beauty trees, just coming into bearing, were sprayed, and one tree left without treatment. An average tree was selected to compare with the unsprayed tree, and it was found that the sprayed tree produced six and one-half bushels, while the unsprayed tree gave only one and one-fourth bushels. Now, in none of these experiments were the plans laid to test the effect of spraying in preventing the early dropping of the fruit, and the results were simply incidental. I do not put these results forward as a record of experiments, but simply as observations. The last case is an extreme one and could hardly be taken as indicative of what might be expected in most cases. It simply goes with the others to confirm the belief that the apple scab often causes premature dropping of the young fruit, and that spraying may prevent this to a greater or less extent.

3. I am fully convinced that four pounds copper sulphate to fifty gallons of water is strong enough to make the Bordeaux mixture, especially for apple, pear, peach and plum, and that it will bear still further dilution in some cases.

4. There is danger of using this mixture (and others as well) too late in the season, on apples and pears. The danger consists in the fact on some varieties it has a corrosive action, and causes a russet appearance on the skin. No harm is done unless more than two applications are made after the time of blooming, and the last not more than two weeks after the blossoms drop. We have heard of some damage being done this season by too persistent and long-continued spraying, but in our own work the harm has always been slight, and as nothing as compared with the benefits. If you wish, you may quote me as saying that where spraying has been done for

specific purposes, and where it was needed, that the failures have been due to inattention to details, except in a few cases where the weather was unfavorable.

From Prof. E. S. Goff, Horticulturist, Wisconsin Experiment Station.

In preparing the Bordeaux mixture, I now make up a standard solution of copper sulphate, by putting forty gallons of water in a barrel and suspending in this a bag containing sixty pounds of copper sulphate. I then procure a quantity of fresh lime which I keep in a large pail that has a very tight fitting cover. Then, when I wish to prepare a quantity of Bordeaux mixture, I slack about four pounds of the lime and draw off five gallons of the standard solution from my barrel, which I keep in the cellar, place this in my spraying barrel, into which I strain the lime mixture, using the ferrocyanide of potassium test. For the latter, I dissolve half an ounce or so of ferrocyanide of potassium in about a half a pint of water, and put the solution into a bottle which has a nipple in the cork like a tooth-wash bottle. By this method the labor of preparing the Bordeaux mixture is reduced nearly one-half. The copper sulphate dissolves in two or three days if suspended in the water, and the use of the chemical test and the straining cloth does away with any excess of lime.

My results in spraying strawberries for the spot disease (ramularia) are purely negative. I now use only the mechanical mixture of kerosene and water, having no longer any use for the emulsion.

DISCUSSION.

Mr. Minkler—I want to to ask if you know anything about the potato worm. It grows up in our region. It goes in the stalk and if you cut that stalk down, you will find a worm in there.

Mr. Burrill—That worm infests a great many plants. It is sometimes called "the Dahlia worm."

Mr. Bryant—In regard to fruit trees; do you advise spraying early in the season, just before the fruit buds open, with the Bordeaux mixture? I understand you did. I want to ask if the addition of lime is for that first spraying? The action of lime, as I understand it, is similar to that of blue vitriol.

Mr. McCluer—As I stated, this paper is almost entirely made from the reports of others. Personally, I believe that for the first

spraying blue vitriol will answer for the purpose. It is easy to use and much cheaper.

Mr. Deland—There is something I want to know in regard to the scab on the apple. It has not been presented, but it comes up now. Some years ago in examining the buds in the spring, just as they were opening, I discovered a little black speck on the blossom, before it opened, outside the leaf. To satisfy myself what it was, I went to the house and got the microscope. I discovered it was the Aphis—the smallest kind I ever saw. They were black. I then looked to see where they came from. On the limb, a little way off, I saw a spot and placed the glass over it and saw cells from which this insect had come. The same amount of heat is necessary to bring them out as to bring out the bud. They are fixed by nature so as to get their living off the fruit. They live on the apple in its present form, and that is what I believe to be the cause of the scab. I wanted to bring this up to see if anyone else had seen this. That was a discovery I made some fifteen years ago on the farm.

Prof. Burrill—Were these black things living at the time you discovered them, or were they eggs?

Mr. Deland—They were moving around on the blossom bud before it opened. There would be any number, sometimes up to twenty on a bud.

Prof. Burrill—The apple Aphis lays its eggs on the twigs, on the under side of the buds. These eggs are black, but the little things that hatch from them at first are green, but in the mature condition they are black—that comes later on in the year. These apple plant lice doubtless have to do with the scab, in a preliminary way.

Mr. Deland—I am not sure but that the things the gentleman has seen are the same as another insect which is propagated from the aphis, the same as you saw on the plant. These I refer to were black and were hatched out on the limb. I watched where they had hatched out and grown, and afterward I examined them closely until they became winged insects and flitted about from one tree to another. I think it is the first I ever saw, and I am satisfied that it has a great eal to do with the scab in the apple.

PROF. BURRILL—The Aphis sometimes has to do with the scab in the apple—not that it is itself the scab; it is only the forerunner of the scab, by its puncture of the epidermis, giving the fungus a chance to start. The place gradually grows into a widening circle until before long it becomes as big as one's finger nail, or two or more of these points may run together and become a great deal larger, often spreading over a large portion of the fruit surface. In pears and such apples as the Early Harvest, this is not uncommon. The fungus can itself penetrate the skin if it gets on the apple when it is young enough.

MR. DELAND—I think they were on the bud and went into it and made a little mark on the apple.

MR. BARNARD—In the matter of spraying we ought to be careful not to think our efforts are useless if we cannot see immediate results. I have no doubt whatever but that spraying for this year affects for next year, and if we keep persistently at it we will find results. We should not get up our enthusiasm about it to-day and then let it fall through, but take on enough industry to carry on the work. I am quite sure that we must attend to the business when it is needed, and the time that is necessary to be given to it must be given or we shall fail altogether. If we do half work we shall only get half profit. Even if we have no fruit let us go ahead with the spraying.

MR. KELLOGG—Would like to ask the Professor if he has experienced all that. The question has been agitated as to spraying in the fall before the spores have become ripe. Can we kill them by spraying?

PROFESSOR BURRILL—I have no doubt we can. Close study is needed to ascertain what will apply to each case, but that will apply to all general cases. We cannot make a general rule that is applicable to all; but in most cases spraying once in the autumn or winter is best, say from September to January. I have no doubt early spraying, before the leaves push out and the buds swell, is a most desirable time for this.

MR. KELLOGG—Mr. Taft entertains the idea that the spores are on the tree and not scattered then and it makes no difference when you kill them, so long as you kill them.

Mr. Winn—Last year I was talking with one of our oldest horticulturists and he says he did not purpose to spray. He said he had not had any fruit and the insects had nothing to live on. He did not spray and the result was he had a terribly wormy lot of fruit. Next season it will be well for him to look out if these insects have been laying. I believe that, under all conditions, that is the only way to get excellent fruit. I have an orchard that four years ago was the worst I ever saw, simply worth nothing at all, scabby and not fit for anything. That orchard has been in fruit this year. I bought it and it went eighty per cent good apples.

The President—Before we adjourn, Professor Burrill has a matter he wishes to present.

Professor Burrill—This is a little specimen of Russian thistle. I am told it has been found here within your town, down by the river. It is found in abundance at Savannah and at Polo. You probably have seen pictures of it if you have not seen specimens, and I think it worth while to pass around this specimen, that people who care to may see the thing itself. Here in this bottle are a few seeds as scattered from the plant. Of course we know that its present name is incorrect. It is not a thistle; it is a plant very closely allied to one that grows in our gardens, which we call pigweed. The only reason it should have special attention is that in the west, in sandy soils in the dry regions, it multiplies most prodigiously and is a very bad pest. It is quite closely related to the "tumble" weed we have been so long acquainted with and grows like it. It is an annual, and some people have been surprised to learn that with this prodigious power of multiplication it shows in the west, it has been growing in northern Illinois for the last eight or ten years; that is, around the vicinity of Chicago especially. It has not spread in anything like the proportion it has in our western states, but we should be looking out for it to take it out at the first chance.

Mr. Hartwell—We have a pest that is equal to it. That is prickly lettuce.

Professor Burrill—It will be a most difficult thing to keep it out, especially along highways in the west.

THE PRESIDENT—In what sense is it annoying?

PROFESSOR BURRILL—It takes everything else. It grows so luxuriantly and so abundantly that other things cannot grow. The Russian thistle is not bad to get rid of in ground that is well cultivated. It is bad in pasture lands and grain fields where the wheat cannot be cultivated. It becomes hard and sharp-pointed, but never like the sharp points on our common thistle. Now the prickly lettuce is somewhat similar in habit of growth, but it has been longer in our country than this. This well-known European plant has not had a bad history except for the last two or three years. Over all the northern, central and northwestern states that prickly lettuce has been coming up. But that has been common with us for quite a number of years, and why it has not developed its characteristics is not known; probably because it withstands drouths.

THE PRESIDENT—Can you tell whether it may have those characteristics of the sweet clover, that is so prolific and covers the roadsides for miles and miles, at the same time we are not troubled with it at all in the cultivated fields.

PROFESSOR BURRILL—The prickly lettuce gets into grain lands like everything—into meadows and pastures as well as by the roadways.

MR. DOAN—Right in the blue grass and in the fields it grows up. It has a prickly leaf and a little yellow blossom.

MR. HARTWELL—In regard to Russian thistles, I have had some experience with them in northwestern Iowa for a number of years. Years ago a complaint came to me that we were having Russian thistles in the northern part of our town. I drove out and found it was true. They were along the highways and in the pastures and fields. I went to work and hired a lot of men to dig them out, and that is the last of the Russian thistles I have seen, so far as I am concerned. As to their multiplying, we have no fear of their multiplying in cultivated fields, but they will in the pastures. I have heard they were very annoying in Dakota, where they raise a great deal of wheat. They will always come up after the wheat crop. I find that if you will dig them out when the plants are young and very numerous you can get rid of them, but when they are mature it

is more difficult. They will cover the pastures and other fields so that it is impossible to drive a horse through them. You can do nothing with them, they are so annoying. They are like a weed. There is where they multiply and distribute their seed. The seeds are very small, and when they get ripe you cannot manage them very well.

Mr. Morrill—My opinion is these weeds are a damage and still a blessing. That is a bold statement to make in an assembly like this, but I don't fear these things and I think they are a pretty good thing to have. There is no use in being afraid of any weed that grows, if you are a good cultivator. You heard Mr. Kellogg's statement that where there is better culture there is a better crop.

Question—*What is the best method of keeping celery for family use during winter?*

Mr. Washburn, being called upon to answer, replied as follows. Perhaps as good a way as any to keep a small lot of celery for family use is to have a small box made, a little deeper than the celery is long. Place the celery in that and put it in a cool cellar. It will continue to grow. If it gets dry and shows signs of wilting, it should receive some water, but care should be taken not to wet it too much, otherwise it will ruin it.

Question—*Can we expect to find profitable market for our unmarketable apples in the shape of cider and vinegar when all the young orchards come into bearing?*

Mr. L. R. Bryant, being called upon to answer, replied as follows: I perhaps ought to take a little exception to the question in that form. If I understand it right, it speaks of refuse apples. Now, in the common meaning of that term, I should say they had no business in cider vinegar. I should say that apples, second apples, not fit for market purposes (if that is the connection in which the term is used) are all right; but if you mean, by refuse apples, apples that are rotten, they have no business in cider vinegar.

That question, in my opinion, is a very broad one, from the fact that there are many things to be taken into consideration. From what I heard of the discussion yesterday in regard to the planting of

orchards in Illinois, it seemed to be uncertain whether planting was going on at the rate the question would indicate. I think, however, we can take it for granted we will have a large increase in the production of apples and necessarily a large percentage will be more or less defective and will not answer for marketable apples. If we could answer that question as it should be answered; if we could believe that the people were using cider instead of beer and whisky and those who were using cider and cider vinegar were insisting upon its being properly made, we could certainly utilize the crop of seconds with very little trouble; but when we take into consideration the fact that the counterpart can be made so much cheaper than the cider vinegar, that the grocer will not handle it, because he can make from three to six cents per gallon more profit in handling the other, I could not answer that question in the affirmative. You can make the best of cider vinegar, but you will only get it on the market on a small scale. You may manufacture it, but it requires a good deal of work; it requires work to sell it and it requires capital, and these small manufacturers can not always afford to put it on the market. It seems to me there will necessarily be a large proportion of these apples that will go to waste for want of a market for the product and for the want of a manufacturer on a large enough scale to handle them profitably. In certain localities where it can be readily shipped to the mills, there will be a large demand. But if there are many apples there must necessarily be a great waste in this respect.

Mr. Pearson—The small manufacturer can make good cider vinegar, but he cannot make it cheap.

Mr. Bryant—The small manufacturer can make it; but can he get a market for it? The manufacturer of cider vinegar has to make his market; he has to go out and sell it, and he comes in competition with the spirit vinegar. It is not a staple article of merchandise like your apples. You can't go and put it on the market and get a reasonable price for it. You have to make your market.

Mr. Pearson—Is the spirit vinegar the worst competition you have?

Mr. Bryant—I think so. The spirit vinegar can be made very

cheaply, and can be sold at wholesale for four cents a gallon. It is made of low wines; is made from corn, most of it.

MR. PEARSON—Whisky and water will make it.

MR. BRYANT—Yes, but ordinary whisky pays a tax, but ordinary wines, from which the spirit vinegar is made, pay no tax. I don't mean to say that an ordinary, small manufacturer can't make cider vinegar, but he can't get a groceryman to handle it. He will find the grocer will hesitate to handle it because it brings in so little profit, and another thing, the small manufacturer cannot keep his vinegar of uniform strength. That is the advantage the large manufacterer has, his vinegar is always of uniform strength.

MR. PEARSON—Do you believe our people would be willing to pay the extra prices in order to secure the pure vinegar?

MR. BRYANT—I believe the consumer would in a great many cases, in the majority of cases. If those consumers were in the habit of getting it pure, they would be willing to pay for it; if they get in the habit of using it, they will demand it. But the question is, whether the retail grocer will handle it unless he is forced to. He will, of course, if the consumers demand it.

MR. AUGUSTINE—Are there no other outlets for these refuse apples or culls?

MR. BRYANT—Certainly. They make what is called "chop". They take the cores and peelings and chop them up, and in this way use them for making jellies, and I understand they also ship this product to Europe, for making champagne wines. A great many apples are canned, but I take it that in canning apples a pretty good apple is required. Of course there are more or less made into jellies and apple butter.

MR. FRY—I understand that one bushel of corn will make as many gallons of cider vinegar as about thirteen bushels of apples, so you see the impossibility of making genuine cider vinegar and competing with that sort of vinegar.

MR. MORRILL—These subjects lead up to the matter of food adulterations, and they are numerous in the whole community. Our State law is all right, but they fail to enforce it. If the fruit grow-

ers would devote their attention to getting a law enforced that would prevent this, it would be greatly to their interest. It is impossssble to compete with this wine vinegar. If you had cider vinegar enough to fill this whole court-house, you could not compete with these men who are manufacturing spirit vinegar, which does not cost more than two cents a gallon to make. It is a question whether it can be made a wholesome substitute for cider vinegar. In the matter of jellies, there is one of the rankest frauds ever perpetrated on the public, and it is a matter that people who grow apples should take a hand in, and they can do it through their legislatures. I venture to say you cannot go into a store in this town and get a sample of jelly that is not composed of a few cores and skins and glucose matter; you can test it by dropping a little iodine in it and it will discolor it. It will not discolor, to any great extent, the pure fruit jelly. There is an enormous amount of jellies consumed, and the rankest of all adulterations is in the jelly business. It could be controlled by our legislatures and the jellies could be thrown out of the market, and they ought to be, because they are dangerous. Regarding the apple cider, the people of our town have sold it by the carload at four cents per gallon, paying twenty-five cents per hundred pounds for their apples. Any man familiar with the cider business, knows that is pretty near the bone. There is not much left far the man that makes it. In that way, competition is driving the pure fruit out of the market. These adulterated fruit products ought to be driven out of the market. Th se fruit compounds are made almost entirely with adulteration. The best made in the city of Chicago is composed of mixtures entirely foreign to what you suppose is in them—cores and jellies with a mixture of glucose, and the seeds of course are in there.

Wednesday evening, 7:30 P. M., convention was called to order.

THE PRESIDENT—We will now hear the report on the spraying machines which have been examined.

Mr. McCluer read the report of the committee.

Mr. President:

Your committee to whom was referred the spraying and other tools on exhibition would report as follows:

We find one spray pump shown by Morrill & Morley of Benton Harbor, Mich., known as the Eclipse, embodying principles of arrangement, which in our opinion makes it superior to any other with which we are acquainted. The machine seems to be well made.

We also found a tool for cutting off runners from strawberry plants, to be grown in hills, or for others early in the season. So far as could be judged without an actual field trial it would seem to be a very good tool for the purpose. This tool was exhibited by R. M. Kellogg of Ionia, Mich. Another tool exhibited by R. M. Kellogg for preparing the place for setting strawberry plants seems to accomplish the object intended in a very satisfactory manner, but without experience in its use we would not know whether the object attained is of special value or not.

G. W. McCluer,
T. E. Goodrich,
L. R. Bryant,
} *Committee.*

The report was, on motion, adopted.

Motion was then made and carried that the election of officers be the first business on the program Thursday morning.

POSSIBILITIES OF PLANT IMPROVEMENT.

PROFESSOR T. J. BURRILL, UNIVERSITY OF ILLINOIS.

Mr. President:

I am to speak to you this evening about what has been accomplished by man and otherwise in the way of modifying the structure, habit and special characteristics of plants so as to better adapt them to our requirements or tastes; the means by which such modifications have been made; and the prospects for further improvement.

If we take those things with which we are each most familiar and compare what we now have with the varieties existing twenty years ago, the wonderful forward movement is easily appreciated. In fact there is probably not a specialist attending this convention—not a florist, an orchardist, a grape grower, a small fruit grower, a market gardener—who could leave out the varieties of plants and fruits which have been introduced during the last quarter of a century and still continue his business with profit. To be sure some of the older kinds are still prominent in the plantations, but new ones and better ones are fast taking their place if they have not already superseded them.

If I were to take a text for this discourse, nothing better could be found than the chrysanthemum with the progress of which we are all familiar. What a wonderful development this plant has had dur-

ing recent years. What a gorgeous show is now made with the immensely differing varieties of this immigrant from the east. What variations in color, in shape, in size, in floral structure, in vegetative adaptations, and all this from an original similar to our ox-eye daisy! This plant as it exists in the wild state has its florets collected in heads like our sunflowers with only an outer row in each head, the ray flowers, large enough to attract special attention, while the central florets are minute, tubular structures not well seen without a magnifier. In some of the cultivated sorts a difference in the ray and disk flowers is still preserved, while in others the whole head seems to be composed of like parts. But the divergence in appearance between the wild plant and recently introduced descendants of it—possibly blended by crossing in some cases with other species—is so great that we need not hesitate to believe that the former as discovered by man had come to be what it was and is through many modifications of simpler structures. To this let us now turn our attention.

It is now something over a hundred years since Goethe, the renowned German writer and scientist, published his treatise on the transformation of plants and established the doctrine that flowers, for instance, are composed of modified leaves. This idea was not new with Goethe, but he first collected sufficient evidence of the fact and put his conclusions into sufficiently clear statements to attract public attention and to convince ordinary observers. But the matter has since become common information. Every elementary botanical treatise of modern date makes mention of the facts and offers proofs of their validity. Until a later time, within the memories of most of us, no one appeared to hesitate to accept the statement that the sepals and petals of a flower, as we find them, are transformed leaves, nor did this acceptance seem to involve anything repugnant to prevailing views of the methods of creation, much less to the accepted doctrines of the relations of man to his Maker. The facts had been observed and their meaning had been understood long before Darwin wrote his *Origin of Species*, over which there came to be so much discussion. The old observations, however, gained wider meaning and led on to conclusions supposed to have far greater importance in the light of the general doctrine of evolution. In regard to this matter it seems to me that a horticulturist especially must accept, in spite of any and all preconceived opinions, the evidence so abundantly before his eyes and within his memories. Without pushing the doctrine beyond our own immediate purposes, and in any and every event without letting it disturb our convictions of the being and attributes of the Creator, without whom nothing could be or become, let us examine some of the evidences of development in the things about us.

The cabbage has a multitude of varieties which have been or are cultivated under a well applied names. Consult a seedman's catalogue. How numerous the kinds advertised and how diverse

the descriptions. Early and late maturing, flat and elongate heads, plain and crimpled leaves, white and red colors, difference in texture, difference in quality, difference in size under same conditions—all cabbages and all forms of one plant, yet how varied in their modern generations. But we must look further. It is sometimes said that however any given plant may vary it never becomes anything beyond its own self. This depends in great measure upon the names by which we know them. In fact the original plant, a native of the seashores of Europe, still well known in its native condition, has given us not only cabbages with the enormously enlarged terminal bud, but also Brussels sprouts with a half-dozen lateral buds, each forming a smaller head upon the side of the stem. The kohl-rabi with its turnip-like thickened stem came from the same source, and the cauliflower so different in structure and appearance has also the same parentage, along with kale, and collards whose leaves are grown for "greens" and their stems for walking canes. As if this story was not big enough, some investigators are inclined to include the turnips in the same category, and by this time we probably do not cry "impossible."

These things stand before us as living testimonials of the remarkable changes brought about through the agency of man working upon the plastic material with which he has to deal. From the standpoint of the plant itself, these wide departures from its natural form and course of life are not steps of progress toward perfection. There is no inherent tendency in the European weed toward an enormous terminal bud as in the ordinary cabbage, or toward a remarkably thickened stem as in the kohl-rabi. Man has noticed some such variations, however, and by his attention and care they have become established as we know them! No new parts have been added. The leaves of this original bud remain evidently as leaves, though they have completely lost in the solid head the function of leaves. The thickened parts in kohl-rabi and cauliflower still show plainly enough the original parts from which they came, and it is easy enough to see just what the change has been.

Now let us take another example and endeavor to push further backward into the history of its developement. The cabbage weed has undergone its varied and remarkable modifications since man's acquaintance with it began, whether or not we can historically trace the relationship. The weed itself had existed as such during many ages of vegetation before man's time, and, as observed above, it still holds to its original weed-like characteristics. Our orchard apple has had a similar history. The very numerous kinds now on exhibition down-stairs, together with the thousands of other named sorts described in our books, all (exclusive of the Siberian crab group) came from a wild species of no more promise than our native crabs. From this small, hard, comparatively worthless fruit, we have all the richness and vari-

ations of our orchard productions, and the amount and value of the modifications are no less than those of the plant just discussed. But every apple bears, stamped in its structure, plain indications of more astonishing transformations. We have all been intimately acquainted with the apple as a fruit. We have dissected and examined every internal portion of it, and have been all our lives familiar with its makeup as seen from the outside; yet few of us have opened our eyes to the wonderful meaning hid in its well-known organization. There are lessons to be learned here that ought not only to stimulate our curiosity, but which should awaken us intellectually to some of the great truths of creation, and should lead us into contemplations reaching beyond worlds and systems of worlds to the Author of them all.

The outside or lower circle of leaves—for they are plainly modified leaves—in a simple flower is called the calyx, and each one of the parts is known as a sepal. In the least modified flowers these parts are separate from each other, but in many cases they are united together or are adherent to the other parts. This union or adherence has evidently come to pass as the modification of the originally separate condition, in good part, because of the crowding together of the organs. Other parts of the flower, like the petals or the pistils, similarly depart from the simple leaf-like form and become wonderfully adapted to special functions.

Now bearing these things in mind, let us cut an apple crosswise into two equal parts in such manner as to leave the stem in the middle of one half, and the "eye" in the center of the other half. Note the five elliptical cells of the core with their narrower, sharper sides clustered near the center of the fruit. The seeds are attached to this inner angle. The walls of these core-cells are firm and polished, while the seeds are wedge-like in shape and when moist are slippery with mucilage upon their smooth hard coats. Looking closer at the cut surface of the fruit a number of green dots can be made out in the whitish pulp. There is one outside of each core-cavity making together an evident circle marked by five points. Then there is another circle similarly marked with each point or dot alternating with the core-cells. The ten dots are regularly placed; other less conspicuous green dots seem to be scattered without special arrangement. By dividing an apple lengthwise exactly through the center, we may easily find (though only in certain sections) outside of the core cavity a curved, green line extending from the stem to the eye of the fruit, and by a little further investigation we can readily satisfy ourselves that the dots of the cross-section of the apple are cross-sections of these lines. Following with care one of those which occur between the core-cavities instead of just outside of one of them, we can trace it to the apex of one of the five projections surrounding the eye of the apple. By appealing to the compound microscope we find that the tissue of the part forming the

green streak is that of the veins of a leaf—in this case the mid-vein or mid-rib. All this means that the five green, triangular appendages of the eye of the apple are rudiments of a formerly free calyx, the lower parts of which are now united together and to other parts of the structure In a similar manner it can be determined that the green dot directly outside the core-cell is the mid-rib of the folded leaf which forms this cell, and from the meeting margins of which spring the seeds, just as peas are produced from the joined edges of the modified leaf formingthe familiar pod. The other green dots are remaining evidences of the other organs of the flower—petals and stamens—or may in part be cross veins of the original leaves above mentioned. They are not so plainly seen, nor so plainly traced to their primitive source, neither do the parts represented by them, if distinct, seem to be thickened into any considerable portion of the fruit as we now have it.

Here then, in an ordinary apple, are the evidences of the marvelous tranformation of a twig, with ten separate leaves, into the one enlarged, consolidated, highly perfumed, richly flavored, and brightly colored apple, whose pedigree reaches back, first to the well-known crab-apple, then back a thousand times further to its fruitless and flowerless ancestor of former geologic ages. We know by direct means of the great modifications of its later history. Shall we doubt the evidences of the earlier if more remarkable changes? Perhaps it may be said that the crab fruit is essentially now what it was when creative fiat produced it, and that all the changes which have occurred are such as are due to man's agency. Then what shall we do with the five rudiments standing in a circle at the blossom end of the fruit, and what with the ten strings of tissue still having the structure of leaf-veins represented in cross-section of the fruit by the ten green dots? Fossils in the earth's crust, evidently representing the things which once actually lived on the earth, were at one time held, by those poorly informed in such matters, to be direct creations as fossils, though there could be no use ascribed to them unless to lead investigators astray. There seems to be no other use now for these rudimentary structures in the apple. They are preserved not for use or ornament, but solely out of respect for their ancestry, as we put away and carefully guard relics of our forefathers.

We cannot stop here. It is impossible to deal with such questions without having others grow out of them. If we gain evidences which appear convincing to us of remarkable, at first almost incredulous, developments from simpler original forms, we ask at once, *how* came these changes to take place? By what means have clusters of leaves become luscious fruits ? What end is reached by the assumed forms? These questions and others like them open up the greatest problems that confront man in his intelligent endeavors to find out the truth in regard to the origin and purpose of created beings and things, and

must inevitably lead to contemplations the Creator also. We must not make the mistake, which often has been made, that any successful endeavor, to find out how creative energy operates, banishes to the extent of the success of the Creator himself. Man may carry a burden upon his own shoulders by the direct agency of his muscular powers, or he may by intellectual and skillful mechanical agencies make a steam engine to do the work for him. Does the steam engine exclude the human agency in the accomplishment? Certainly no one need fear the use of his eyes and powers of observations lest he be led away from the great Source of all life and of all being. No one gains entrance to the presence chamber of the Almighty more becomingly or more assuredly than the devout naturalist, and nothing tends more surely toward an exalted conception of the Creator than the closest and deepest investigations of the kind before us.

In seeking to find out how and by what means these transformations have been made we shall not go far without recognizing at least two very important principles, viz., variation and heredity. When examined closely no two things are found to be exactly alike. We say "as like as two peas," but no two peas are alike through and through. No two plants springing from such similar seeds are so similar that differences may not be easily found. The differences are sometimes comparatively trifling, sometimes surprisingly great, but nothing is easier to substantiate by observation than that variation in nature is a general, apparently universal, phenomenon. That like begets like is also a familiar observation. The rule is so thorough in its working that we are sometimes led to think of any wide departure from it as a "sport," an anomaly. When we study, however, the complexity of the make-up of any living being, the intricacy of organization, part correlated with part down to microscopical cells and elements of tissues, the real wonder is that substantial likeness ever occurs. Given ten thousand numbers in a computation, any change in any one of which may immeasurably change the final result, how easy is it, without the utmost care working by the most inflexible rules, to arrive at, the second time, the same summary as the first accounting produced. What then is the likelihood of obtaining two results alike in such a computation when all the factors are variable! Yet this is what is meant in nature when we trivially say "like produces like." We have not opened our eyes to the fact that in this vulgarly observed law is something worthy of the attention of the profoundest philospher and most accomplished investigator. Heredity is a wonder, an unexplained marvel, if not miracle.

Without now trying to follow further the teachings and bearings of scientific inquiries touching heredity and variation and without entering into the disputed question whether or not there is any inherent tendency towards advance in organization through variations, it

may be said that good reasons exist for the belief that "natural selection" has been effective in such developements as have been described above whereby the apple fruit has originated from leaves, just as man's selection has been rewarded by the production of the orchard apple in its best estate from the comparatively worthless crab. This is a meager statement of an exceedingly important matter on its practical side, but must suffice for the present.

Aside from the ordinary variations there is one method of modification, however, which must not be passed without remark, viz.: cross fertilization. The primary object of fertilization is the production of seeds, and of cross, rather than self, fertilization—the production of more or better seeds. The special point with which we have to deal is the fact that the projeny of two unlike parental forms differs from both of them, and so in some sense is a new creation. That new species have sometimes so arisen in nature is incontestable, and that Horticulture has been much enriched through this means is well known. The new characteristics or qualities may or may not be desirable onesf rom our standpoint, but opportunity is especially given by this means for selection, both in nature and in art. It therefore is a process which means to the horticulturist vastly more than the production of seeds or even of those of a more vigorous type. All sorts of deviation from the type may be anticipated and among them something is likely to be worth attention from the cultivator.

If seed is the primary object in the process of pollen fertilization, secondary effects are often introduced, as when this or the other part of the plant becomes peculiarly developed into fleshy substances popularly known as fruits. In the apple we have seen the consolidated calyx and ovaries so enlarged. In the strawberry and fig it is the tip of the flower stem, solid in one case, hollowed out in the other. In the cashew nut it is a portion of flower stem below the tip, and in the tomato it is the ovary only. These secondary developments are of the same nature as are the hereditary characteristics which make the differences between cabbage, Brussel's sprouts, kohl-rabi etc., perpetuated however for the most part through natural rather than through man's selection. Still there is nothing to prevent a possible addition to our "fruits" by some sharp observer's selection of what seems to be a chance variation from the usual effects of the fertilization of flowers. We see enormous swellings answering to the sting of a small insect. Here we have apparently by the hereditary transmission of the tendency of such swelling upon a certain stimulus just what happens in these secondary effects of fertilization. We must not suppose there is any necessary connection between the secondary stimulus (outside of seeds) in the effects of the pollen and the fertiliz-

ation of the seeds themselves. The strawberry and the so-called barren strawberry (Potentilla) are very closely related plants, yet in one case the receptacle is developed into a pulpy "fruit" as a concomitant with the fertilization of the seeds, and in the other case it is not so enlarged.

One thing more. The secondary effect may continue after the primary one has been lost, as we not uncommonly see in seedless "fruits." This is the case with the banana, bread-fruit, pineapple, Corinth grapes (currants of the stores) and certain oranges, apples, pears, etc. There is every reason to believe that a strawberry could be obtained in which with infertile or undeveloped seeds the full pulp of the receptacle would be produced, though now we know the latter is dependent on seed production.

Having now considered what has been done in plant improvement in nature and by man, and having paid some attention to the means by which these modifications have been brought about, it only remains to query what may be done in the future. The same methods which have been so fruitful in the past are open to us everywhere. The end has not been reached. Indeed we have just made a beginning. Nearly all the orchard fruits we cultivate and many others are either natural seedlings or are chance foundlings in cultivated conditions. We do not know enough yet of plant physiology to permit us to go directly about the production of any desired new quality or kind in plant improvement. A member of this society was fortunate enough to find among many chance seedlings one strawberry plant which, taken all in all, is probably the best one in commercial cultivation. He has now been trying for years in a more systematic way to produce something better and has raised thousands of plants from cross fertilized and self fertilized seeds without, however, succeeding to his satisfaction in the results. From every present indication we must still keep up a sharp outlook for good things in the byways and hedges, but can proceed with confidence that good things are yet to be found even in this way beyond all past experience and beyond all fancied limitations. The more recent results of systematic plant breeding give promise of larger and more direct progress and add encouragement to the idea that we shall soon learn to direct our efforts to more successful issues. At all events this field of investigation is full of promise and should attract large attention on the part of those seeking, by scientific methods, not merely to find new things but new principles and reasons for observed phenomena. We need better interpretation of the bearings of known facts and we need an increase of knowledge along the lines of plant life and development. Our experiment stations may indeed make valuable contributions to Horticulture through careful attention to the more

common methods of adding new productions to our lists of flowers and of fruits, but they will do vastly better to marshall their forces towards finding out and making plain those deep-lying and far-reaching elements in plant life upon which improvements are based and by which we may hope to proceed according to the law of cause and effect. We shall merit the name of scientific workers in this field only when, given certain elements and combinations, we can predict the results; only when, in other words, certain predictable results follow definitely planned experiments. We cannot now gather grapes of thorns nor figs of thistles, perhaps may never try to do so; but there seems to be no good reason why we may not in a very large degree make of plants what we like, and make them produce what we like. There is certainly abundant reason for hopeful trial. The possibilities of plant improvement beyond present attainments are decidedly hopeful.

DISCUSSION.

Mr. Pearson—I would like to ask the Professor if he has any way by which he can point out the path? Can you reach it by chance, or is there a line to follow?

Mr. Burrill—I think Mr. Pearson, by asking the question, practically answers it. We have been picking here and there and we have got to keep blundering on, but we ought to learn better.

Mr. Morrill—We have to treat it entirely as a blundering matter; but we have a man who has come nearer to producing what he wants, than anything else, that is Luther Burbank of San Jose, California. We have come to believe that he can produce almost anything.

Mr. McCluer—If you read Mr. Burbank's statement, you will find that for every success there are about a million failures.

Mr. Kellogg—We are going by blunders; the reason of it is we cannot follow anyone through. All of our fine fruits are blunders. There is not a man here who knows the parentage of a single fruit we have. The pollen comes from this place and that, and all you can do is to bud it.

Mr. Hartwell—As somewhat contradicting this, Mr. Bubach produced his No. 5 methodically.

Mr. Guilford—Some of our pomologists over in Iowa have better success when we classify apples in the particular families to which

they belong. They have been getting from something inferior. They have been propagating by cutting and not by seed, and they have lost in a measure their ability to reproduce from seed. The Richmond cherry is an illustration of that. It was produced in England at Kent, and it can hardly be produced from seed. When you try it, you get back into the English Morello. These new cherries grow as readily from seed as any other way, but you take the Richmond, it has been at it so long, it has lost its ability to produce from seed or grow from seed. Some are claiming we are producing apples so much from buds and not seed that it can hardly assimilate those qualities of the old with which it will cross. Take the Ben Davis; we want to improve its size, flavor and color; it is a long time ago since it originated. What its parentage is, we cannot tell, and we might cross it with the same family. The Hibernals are being pretty well classified as to what they are, and there is some hope of producing a pretty hardy apple. We don't expect to produce an apple as good as the Grimes' Golden and Jonathan, but crossing the Hibernal with the Hibernal, we don't know what we will get.

Mr. Piper—I wanted to get a Rambo, the old-fashioned Rambo, about the size of the Ben Davis, consequently I went at it by crossing, and put a sack over the blossoms I wanted to cross, and one over the Ben Davis from which the pollen was to be taken, and I watched until it was about ready to open, and then I cut the bloom from the Rambo and carried it and put it in where the Ben Davis was, and gave them a good shaking up, and took the bloom from the Ben Davis and put it on the Rambo, and to-day I have a tree that looks exactly like our old Rambo, but the apple is very beautiful. It is a bright red, but it is neither a Rambo nor Ben Davis. I have a specimen of it which I wish I had brought to show the cross. Meantime, I crossed the Willow Twig on the Wine Sap and picked several hundred seed, and planting them, they all came up and grew pretty well the first season, but I set the boys to work to hoe the place and didn't think to tell them I had my seedling apples there, and they cut out all but one, and that is there yet. It is more beautiful than the Rambo, but not as good, but it is still better than the Ben Davis.

Mr. Cotta—I would call the attention of this audience to one product of crossing two varieties of apples. The Pewaukee apple grown from the seed of the Duchess, fertilized by the pollen of the

Northern Spy. I think that is the result of intelligent work in this line. The tree is much more productive and better than the Northern Spy. It has come to stay, and is of much greater value to the commercial orchard than the Northern Spy.

MR. PIPER—Whenever you undertake such a thing as that, put sacks over your buds or tie them up.

MR. GUILFORD—We commenced with one pure tree; that is, the Duchess. We got them a little late, and experimented, but invariably it was the Duchess of Oldenburg. We have several seedlings of the Duchess that are selling well on the market; but it is one of the pure trees. At the college grounds we have thirty or forty of the trees growing. It has been done systematically by Professor Mason and the boys at college.

Thursday morning, December 13, the meeting was called to order at 9 o'clock.

The session was opened by prayer by Rev. Dr. Sickle.

THE PRESIDENT—We will now have the report of the Awarding Committee.

Mr. Fry then read the report of the premiums that had been awarded on products exhibited at this convention as follows:

CLASS I. OPEN TO ALL.

Collection of twenty-five varieties of apples—First, J. T. Johnson, Warsaw; second, Jacob Christian, Mt. Carroll.

Collection of five varieties of new apples—First, J. V. Cotta, Nursery. (Varieties, Lanark, Eicke, Nathusius, Milwaukee, Baumm's Reinett.) Second, J. Christian.

Best new apple—First, J. V. Cotta, variety Milwaukee; second, D. J. Piper, Forreston, variety, Sweet Rambo.

Best seedling apple—First, Jacob Christian.

CLASS II. NORTHERN ILLINOIS.

Four varieties of winter apples for market—First, J. V. Cotta, Willow, Walbridge, Pewaukee, Ben Davis; second, L. R. Bryant.

Four varieties for family use—First, J. V. Cotta, Pewaukee, White Pippin, Grimes' Golden, Jonathan; second, L. R. Bryant, Jonathan, Northern Spy, Ben Davis, Willow.

Three varieties of fall apples for family use—First, J. V. Cotta; second, S. G. Minkler, Oswego.

Best single variety winter for market—First, S. G. Minkler, variety, Minkler; second, L. R. Bryant, Willow.

Best single variety winter for family use—First, J. V. Cotta, Jonathan; second, L. R. Bryant, same.

Best variety fall for market—First, Jacob Christian, Snow; second, J. V. Cotta, Lanark.

Best variety fall for family use—First, J. V. Cotta, Snow; second, Jacob Christian, Snow.

PLATES OF SINGLE VARIETIES.

Ben Davis—First, A. F. Moore, Polo; second, J. V. Cotta.

Willow—First, S. G. Soverhill, Tiskilwa; second, F. M. Smith, Dixon.

Jonathan—First, J. V. Cotta; second, F. M. Smith.

Grimes' Golden—First, J. V. Cotta; second, D. J. Piper, Forreston.

Minkler—First, S. G. Minkler.

Domine—First, D. J. Piper; second, Jacob Christian.

Roman Stem—First, Jacob Christian; second, C. R. Powell, Sterling.

Snow—First, J. V. Cotta; second, D. J. Piper.

Northern Spy—First, L. R. Bryant; second, D. J. Piper.

Cayuga Redstreak—First, S. G. Minkler.

In addition to the above awards, J. V. Cotta exhibited plates of the Salome, Pewaukee, Missouri Pippin, White Pippin, Walbridge, Black Annette, and McMahon's White. The committee recommend special mention to Mr. Cotta's collection and suggest that the plates of Pewaukee and Walbridge, being unusually fine specimens, should have a money prize of one dollar on each plate awarded them.

D. J. Piper also had on exhibition plates of the Tallman's Sweet, Mann, Janet, Romanite, Clark's Greening, Wythe and a seedling apple which were all worthy of special mention.

Awarding committee—Len Small, Geo. J. Foster, W. S. Perrine

CLASS III. CENTRAL ILLINOIS.

Mr. J. T. Johnson was awarded first premium on the following:

Four varieties winter apples for market, viz., Ben Davis, Minkler, Willow, Winesap.

Four varieties winter for family use; Winesap, Jonathan, Wythe, Rawle's Janet.

Three varieties fall, for market; Snow, Hawley, Fulton.

Three varieties for family use; Bailey Sweet, Plum Cider, Hawley.

Best variety of winter apple for market; Ben Davis.
Best variety winter for family use; Winesap.
Best variety fall apples for market; Grimes' Golden.

Plates of single varieties.

Mr. Johnson was awarded first premium on the following plates, viz.: Ben Davis, Rome Beauty, Jonathan, Grimes' Golden, Minkler, Bailey Sweet, White Pippin, and second on plates of Winesap and Willow.

Mr. C. G. Winn, of Griggsville, was awarded first on plates of Willow and Winesap.

CLASS IV. SOUTHERN ILLINOIS.

On account of the failure of the apple crop in southern Illinois, that section was not represented in the display.

Class v. Vegetables.

Early Potatoes; first, F.W. Poscharsky & Son, Princeton, Early Ohio; second, ditto, variety, Burpee's Ex. Early.

Late Potatoes; first, D. J. Piper, var. World's Fair; second, E. M. McCune, Dixon, Green Mountain.

Onions from seed; first, C. Auschick, Ottawa; second, Poscharsky & Son.

Onions grown from sets; first, Poscharsky & Son.

Three heads of Celery; first, D. J. Piper; second C. Auschick.

Turnips; first, W. G. McGinnis, Dixon; Second, G. Storer, Grand de Tour.

Beets; first, F. W. Poscharsky & Son; second, W. G. McGinnis.

Parsnips; first, J. Auschicks, Ottawa.

Carrots; first, Poscharsky & Son; second, J. L. Hartwell, Dixon.

Winter Squash; Poscharsky & Son, first and second.

Cabbage; first, Poscharsky & Son; second G. F. Hughes, Dixon.

Salsify; first, D. J. Piper; second, J. Auschick.

Awarding committee-Andrew Washburn, H. L. Doan, John M. Pearson.

The reports were adopted.

The meeting then proceeded to the election of the officers for the ensuing year, with the following result:

T. E. Goodrich, Cobden, President.
J. L. Hartwell, Dixon, Vice-President.
Henry M. Dunlap, Savoy, Secretary.
Arthur Bryant, Princeton, Treasurer.

The meeting then proceeded to ballot on the place of holding the next annual meeting of the Society, invitations having been received from Kankakee, Alton, Mt. Vernon, DuQuoin and Rockford, resulting in the choice of Kankakee, on the second ballot.

Mr. Bobinett of Missouri—I wish to thank the Society for the courtesies they have shown me as the delegate from Missouri. I feel that I have been so courteously treated that I wish to thank you. I want to get away at 11 o'clock, and must leave now. I therefore herewith extend my thanks, in the name of Missouri, for the kindness shown her delegate. I hope next year you may receive many delegates from there.

The President—We would have felt better if we could have had you with us this afternoon, but we certainly are grateful to the Missouri State Horticultural Society for sending Mr. Bobinett, and would have been glad to have had him remain longer and give us the benefit of his experience. We extend our congratulations to the Missouri Society.

Mr. Kellogg of Michigan—I must get to the train, and will have to leave. I wish to thank you cordially for the pleasant memories and the crumbs of wisdom which I have been able to pick up here. I wish to join with Mr. Morrill in extending you a cordial invitation to visit Lowell, Mich. We will try to make it pleasant for you. I can hardly say as pleasant as you have made it for us, but we will do our best.

The President—Mr. Kellogg, on behalf of the Society, I want to say we have certainly appreciated the efficient help we have had from you and Mr. Morrill. Every member of this Society will join with me in saying that we have had much pleasure in having you with us, and are benefited by the help you have given us. We wish you a safe return and prosperity to your Society.

REPORTS OF THE HORTICULTURAL SOCIETIES' EXPERIMENT STATIONS.

BY G. M. McCLUER, SECRETARY COMMITTEE OF DIRECTION.

Mr. President:

I have found some difficulty in making up a report for this meeting that should not be too long for our purpose and yet do justice to all the reports sent in from the individual station superintendents. For while a few have been of but little value, except as they gave evidence of life, others are very good, showing evidence of careful observation in the station, and care in preparing the report. I think it might well be worth while for the Society to publish some of these individual reports complete.

Two of the stations have not reported, No. 6, at Gilman, and No. 12, at Lacon. Some of the reports received have been used little or none in making up this combined report. The past season has been very unfavorable for fruit growers, in many respects. This has been given as the reason the reports are not more complete.

APPLES.

Mr. Bryant reports most of his older planted trees as doing well, but not fruited yet.

Mr. Cotta makes an interesting and valuable report, though it still leaves some things that could be wished. His comparison of root grafted and top grafted trees would have more value, as he says, if more of the same varieties had been both root and top grafted. Top worked Akin and Arkansas Beauty are both said to be sound, while the same varieties, root grafted, are either dead or seriously injured. Marshall Red and Dr. Walker top worked are sound, while the same varieties root grafted have died.

Morris, a Duchess seedling, in season during September and October; Nathusius, from northeast Germany, in season from October to December, and Good Peasant, are noted as having borne both in 1893 and '94. Mr. Cotta would give the Good Peasant, which is the same as Longfield, a very high place as a good apple, a great bearer, and a good hardy tree. Its season is September to October.

The following are recommended as promising: Early Champagne, Patten's Famous, Isham Sweet, Nathusius, Wythe, Milwaukee and Good Peasant.

With us, at Champaign, the Good Peasant has been very bad to rot.

Mr. Dunlap says the Wealthy, of which so much has been expected, is exceedingly bad to rot.

PEARS

have not been grown long enough to get more than some general characters of the tree. Bryant speaks of Ames' Orgereau and Hardy as having borne one or two specimens that were very promising. Cotta speaks of Idaho and Fitzwater as having died of blight. Goodrich says Bessemianka, Sapieganka, Josephine de Malines, Souvenir de Congress and Wilder, seem especially liable to blight.

Both Cotta and Prescott speak of Sapieganka, Swiss and Kieffer as being promising trees, and Mr. Cotta, in his report for 1893, speaks of Duhansel du Morceau, Fitzwater, Lincoln Coreless, Souvenir de Congress, and an unknown Russian, as lacking in hardiness to stand his climate.

PEACHES.

There is no report to be made on peaches from any of the stations.

CHERRIES.

Of cherries Mr. Bryant says, Northwest, Carnation and Suda Hardy, have borne some, and all seem promising. Mr. Cotta reports Amarelle Bouquet, Frauendorfer Weichsel and Russian No. 62, as being in good health, and apparently hardy. The rest of his list is reported as dead, or nearly so. They are Early Richmond, Dyehouse, Carnation, Montmorency Ordinare, Northwest, English Morello, Wragg, Suda Hardy, Ostheim, Ostheimer, Riga Oral, Schatten Amarelle, King's Amarelle, Brusselier Braune and Bessarabia.

PLUMS.

Of the experiment stations Mr. Bryant is the only one reporting fruit on plums this year. He has had a good crop and would no doubt recommend plum growing strongly. He speaks highly of Simpson and Bradshaw (Europeans) and Arkansas Lombard, Hawkeye, Wolf, Golden Beauty and Missouri Apricot, both for fruiting and character of fruit. Pottawatamie, Spaulding, Forest Rose, Prairie Flower (natives), and Moore's Arctic, Niagara and Saratoga (Europeans) have either not borne so well or are of comparatively inferior quality.

With Mr. Cotta, Robinson, Ida, Pottawatamie, Wolf and Forest Rose have borne some, but no recommendation is made. It may be of interest to know that several of the Japanese varieties have proven hardy that far north; among them, Abundance, Ogon, Saturma, Yosobe, and another unknown variety. That they remain uninjured, however, is not an indication that they will be of value for fruiting. While they have bloomed full for a number of years, with us at Champaign, we have had no perfect fruit, and some of the varieties, at least, I should expect to be short lived.

We cannot judge of the value of a variety by one crop of fruit. From our own experience with plums, I have had about as many opinions as to which is the best variety as I have had years of experience. Taken altogether, Wild Goose on peach roots has been most reliable for bearing, but it is short lived. Robinson bears regularly and full, but rots badly. Many of the other varieties, as Rollingstone, Wolf, Speer, Forest Rose, etc., have bloomed full every year for five years and each has borne one good crop in that time, and only one.

GRAPES.

Mr. Bryant speaks well of the Green Mountain. It is a small white grape, very early, sweet, tender and excellent in quality. Rather small for market, but good for home use. Eaton, a large black grape, bunch rather small but showy. It is only recommended as a variety. Northern Muscat, a small dark grape, not specially valuable. Colerain and Esther are regarded as rather promising.

Mr. Browne says the Herman Jaeger is of the same general appearance and quality as the Cynthiana, but larger. Rommel, though small, is of fine quality.

I cannot help thinking that the reports from several of the stations on grapes might have been made more complete and at the same time much more instructive. There is too much of a tendency to speak only of the new things with no reference to any other variety. It would be better to compare the new varieties more with standard kinds that are well known.

Goodrich reports the Hicks' mulberry as being killed down to the ground. Hicks, Downing and New American die down regularly with us at Champaign.

Cotta reports the Japanese chestnuts and walnuts as either killed or badly injured. We have a Japanese walnut (*Juglans Sciboldii*), which passed through several winters without injury, but it was transplanted a year ago and as a result died back nearly to the ground.

CURRANTS.

Of these fruits, which are not grown as much as they should be, there is not much of a report to make.

Mr. Byrant speaks well of Wilder and Ruby Castle. Cotta says, Ruby castle, Wilder and North Star have grown well, but not fruited; and that there is nothing in the Crandall to recommend it.

GOOSEBERRIES.

Red Jacket is recommended by the three northern Stations, but has not done well at Alton. Puyallup is given more praise than any other variety by Mr. Browne, but would rather be put in the rejected

list by both Byrant and Cotta. Champion is well spoken of by Bryant and Cotta, but would be rejected by Prescott, who has had ten years' experience with it. Browne speaks well of Columbus. The others do not mention it.

BLACKBERRIES.

Mr. Bryant speaks in his report of Minnewaska, Ford's No. 1, Ohmer, Maxwell and the Evergreen blackberry, and would put all of them in the doubtful list. The Evergreen is from the Pacific Coast; is not hardy here and would have to be protected.

Cotta puts Snyder, Ancient Britain and Barnard, as the only ones he would recommend. Minnewaska is given as of doubtful value, and Stone's Hardy is rejected on account of being too seedy.

Prescott would reject Eldorado, but does not mention any other varieties.

Webster recommends Early Harvest and Lawton Jr., and rejects Erie and Minnewaska. The Lawton Jr. is a new local variety. I think from Mr. Webster's statement that he has some other variety instead of the Minnewaska. He describes it and the Erie as being very similar, while they are really quite different.

Mr. Goodrich puts Riehl's and Minnewaska on the recommended list, but does not mention any others. It is not to be understood that he would reject Early Harvest.

No two experimenters put the same things in the recommended list, though I think there would have been considerable uniformity if all the standard varieties, as well as the new ones, had been mentioned.

RASPBERRIES.

On raspberries five stations make partial reports.

Mr. Cotta, in the extreme northwest part of the State, would put in the list of best varieties, Eureka and Kansas, and probably Older for black, and Schaffer's and Cuthbert for red. IXL would be doubtful, and Spry's Early, Winona, Ada, Cromwell, Golden Alaska, Gladstone, Royal Church and Muskingum would be rejected.

Prescott recomends Kansas and rejects Spry's Early.

Bryant recommends Gladstone on account of its ever-bearing quality. Kansas, Eureka, Older, IXL, and probably Arctic, are recommended as of value. Lovett, Cromwell, Winona, Ada, Royal Church and Muskingum are put in the doubtful list, and Spry's Early, Thompson's Early and Golden Alaska are to be rejected as not of sufficient merit to be recommended.

Dunlap puts Kansas and Older at the head of the list of newer kinds with Winona, Muskingum, Spry's Early and Golden Alaska, as of doubtful value, and Cromwell rejected.

Goodrich would make no recommendations among the newer

varieties, but would reject Progress, Thompson's Early and Japanese Wineberry.

Webster, of Centralia, puts Kansas at the head of the list of raspberries, but makes no mention of any other varieties. All the stations recommending anything, recommend the Kansas. Three recommend Older and two Eureka.

From some correspondence with the introducer of the Older raspberry, I doubt if Mr. Dunlap's are true. As he has them the plants would not differ materially from Gregg, or any of the large growing varieties, but the originator's description is quite different. The source of the Arctic and Golden Alaska ought to be almost enough in itself to condemn them.

STRAWBERRIES.

Mr. Goodrich of Cobden makes no report on the behavior of standard varieties, and does not compare the new ones with them. Six varieties are spoken of, of which four are good enough to be recommended: Smith's Seedling, Riehl's No. 6, Princeton Chief, and E.P.Roe. Riehl's No. 5 and Van Deman are spoken of as of doubtful value.

Mr. Browne of Alton, speaks of the standard varieties only in a general way, but he gives as the best of those grown by him, the following in the order named: Williams, Riehl's No. 6, Bett's No. 3, and Riehl's No. 5. Timbrel is regarded as of doubtful value.

Mr. Prescott (Marengo, extreme northern Illinois) in 1893 recommended very favorably Dayton, Princeton Chief, Glenville, Hatfield, Warfield, Haverland, Crescent, Bubach, Sharpless and Parker Earle. But for the present year he has thrown out of this choice list, Dayton, Hatfield, Princeton Chief and Parker Earle.

Mr. Bryant of Princeton (in 1893) does not mention the standard varieties such as Warfield or Crescent. Of the newer ones Thompson's, No. 7, Beder Wood, Parker Earle, Haverland, Boynton and a seedling from D. J. Piper are spoken of as specially promising. Martha, Lovett's Early, Enhance and Waldron would be of doubtful value, and the rest, Lady Rusk, Pearl, Great Pacific, Hattie Jones, Yale, Clara, Sadie, Shuster's Gem, Porter, Miller's Seedling, Miami, Tippecanoe, Westbrook, Williams, Wolverton, Gov. Hoard, Edgar Queen, Middlefield, Saunders, Princess and Barton's Eclipse would be put in a list as rejected.

From these reports it would be hard to make general reports for planting. The new varieties which two stations agree belong in the first class are, Princeton Chief and Riehl's No. 6. The rest have one vote each. Perhaps the thing to do after all is to plant Warfield another year and risk it.

The trees in Station 4 (H. M. Dunlap, superintendent) made a good growth during the season, and with a favorable winter will, many of them, have fruit on next year. Several years ago this

station was authorized to make some experiments in mulching old trees to increase their fruitfulness. I will say that the results are such that we can recommend this treatment to all orchards and those of any age, in fact, that are in a bearing condition. The first experiment was on two rows of cherry, of the Early Richmond variety. Two loads of fairly well rotted barnyard manure was put around each tree, covering the ground when applied to a depth of about four inches. This was put around the trees in the month of March. The trees, that season, that were manured in this way made an average growth of about eight or nine inches, varying on the lower limbs from four to a growth on the upper branches of fifteen inches. Other trees of the same variety in close proximity to them, but *not* manured, made a growth of three inches on an average. The foliage on the manured trees was of a dark, rich green, while on the others it was of a much lighter color. The following season all cherry trees were heavily loaded with fruit, and while those trees that were treated the previous year matured their fruit early, of excellent quality and size, and brought the highest market price, those which had no manure were unable to bring the large crop of fruit with which they are loaded to maturity, and therefore after the fruit first mentioned was shipped we undertook to dispose of the latter which ripened later, but owing to the small size of the fruit and the very inferior quality, we were obliged to let much of it go to waste upon the trees from no other reason apparently than that the trees were not fed sufficiently to mature their crop.

A similar experiment was tried on apple trees thirty years of age, with similar results so far as foliage and general health and appearance of trees are concerned. Last year there was no fruit, but this year those trees which made the best growth last year from heavy mulching or cultivation, were the trees which bore the largest crops and matured the best fruit. We are satisfied that the experiment proves that it will pay too mulch bearing trees for results in health of tree and amount and quality of fruit.

DISCUSSION.

Mr. Guilford—In our State we have a report from the Experment Station, and we are trying in every way to improve on them. The report of each station is laid before the meeting, and goes through the same discussion as any other paper. The representative of the station is there and he has to make a great many explanations and show the conditions under which he makes those experiments, and sometimes when the reports get under the cross-fire, we find out

they are worthless. Our men at the station are apt to take more interest in some kinds of fruits than in others, and in that event, while they take particular care of that in which they were especially interested others would be neglected. You should notice just about what time of year the stock comes to you. Our distributing committees push them in to us just about the time we have our hands full, and we cannot look after them. The people who have those stations in Iowa are men who are more or less connected with the nursery business, and unless he gives it his personal attention, he may lose track of it. They have sent to me time and again fruits and flowers that I have thrown away years ago. I have gone through 150 varieties of my apples and there are strawberries coming to me every year that I am rejecting. In regard to top grafting, that is a subject of importance to any man who attempts to grow an orchard. There is no universal stock for all apples, and I don't believe one-half of our apples are fit to grow on their own roots. Every man knows he can tell what kind of roots are under a tree before he takes it up. When we take and put the stock into the ground and top work it, we have a root there that will not be interfered with. A great many trees that are absolutely tender on their own roots are perfectly hardy on others. I have on my place some Ben Davis that were top-worked; they were top-worked in the fall of 1886 and 1887. I reported to the State society that I had the only five living Ben Davis trees that were in the whole State of Iowa, and it was a fact. There was not an uninjured Ben Davis from Iowa to the North Pole that I heard of. During that time the second planting was going on. Mr. Patten of Charles City, and Mr. Gorden of Osage, are highly interested in top working. Prof. Budd is experimenting with the Hibernia, taking the worst of them and using them for stock; but in using them as stock, it cannot really be done in the nursery, it must be done in the orchard; and that is why the orchardist should learn to do the work himself. The fact of his knowing how to do it will never bother him. He wants to know what to do and the reason why he should expect success, although he must always get a helping hand from the Experiment Station.

Mr. Goodrich—In regard to sending duplicates; we do not do that way in this State. We have a board of control which has a record

of what is in the station and they send a list of what they propose to send us and if we have that they do not send it to us. They do not send what is not needed, and this saves a great deal of money.

MR. PIPER—I brought an apple here and a man claims that he crossed it with the Bellflower and Snow apple, but it is neither. It looks much brighter. The eyes of the apple are wider and it has the taste of the Snow apple. He claims that it will keep equally with the Willow Twig. He calls it the Winter Snow. The taste is something similar to the Snow apple. It always keeps until May. The tree is hardier than the Snow apple. I was there only a few days ago and the tree has fruit on it. It has fruited for five or six years.

MR. BELL—Has anything been said in regard to the Columbus strawberry? We have it in our section. A gentleman from South Water street in Chicago, was telling me that he was present on the arrival of a carload of strawberries and they were every one in very bad condition except the boxes of these Columbus berries. They were the only ones that were worth anything. He is raising them there in our section and they have proved a great success. If they have not been experimented on, it might be well to send some of them to the stations.

MR. BRYANT—Is it in order to discuss the remarks of Mr. Guilford? As I understand it, it is not in regard to new fruits, but top-working varieties. If I understand his suggestion and advice to the farmer, it is to get the stocks and plant them in the orchard and top-work them himself. I question the advisability of that. It is the work for the nurseryman. It can be done in quantity in the nursery and much better. I find when you plant a tree in the orchard there is difficulty in keeping out the insects, and the result would be, I was not successful in top-working, so that my orchard was not complete in that respect, in the varieties I wanted. Would it not be better to top-work them in the nursery and for the ordinary planter to buy his trees all ready.

MR. GUILFORD—I differ from him. If we take a strong growing tree (and it is characteristic of strong young roots like the Virginia Crab or some of the Hibernia apples) if we take them at two years old and plant them in the orchard, then we have a strong, vigorous growing tree. It has gone through its first winter and it makes a

profitable growth under any condition. And that is the very condition your orchards grow up under. Trees get their death blow the second winter. Get the limbs to be healthy to three-quarters of an inch and graft on limbs after they have made eighteen to twenty inches of growth, you know that tree is growing vigorously and taking good care of itself. You graft it next summer and it will not only heal up the wounds of the graft, but make another growth. If you graft it in the nursery, you must grow it in the nursery two more years and by that time it is rather too large to transplant. I believe the more of the young fibrous roots you get out of the ground the better. One old root is better than two young ones. That is the reason why I prefer doing the work right in the orchard.

Mr. Barnard—I would ask Mr. Guilford at what age he recommends top grafting?

Mr. Guilford—Two years old in the nursery and two years in the orchard.

Mr. Goodrich—I try to make a specialty of pears, and wherever there is a new kind introduced that grows very large and is very fine I always want to get it before my neighbor gets it. Now, Mr. Chairman, I have heard of a certain kind of new pear in the central part of the State and I should like to know if any of the members can tell me anything about it. It is the Sudduth. Can the chair give us any information?

Mr. Augustine—Perhaps I should not say anything about it as I am in the chair, but I have heard of it and I have investigated the history of this pear. In view of that fact, I will say I think it the most remarkable pear tree I ever saw. I had my attention called to it by Mr. Sudduth, who has the original tree on his place. About ten years ago he called my attention to it but I let it pass. He lives near me in Sangamon county. He said he would like to have a few of the trees propagated. He sent down some scions and I grafted and got about fifty little trees and grew them to be two years old. One day I had the digger run under them and sent them up to his place and made him a present of them. Last year his son sent and asked me if I would not send a man to transplant some of the trees I had given him. I went up to look at the trees and saw a healthy,

fine-looking tree. I then went up to Mr. Sudduth's residence and, in conversation with him, got the history of the tree. I will read you a statement by him in order that you may know.

THE SUDDUTH PEAR.

I first knew this wonderful pear tree in 1835, the seed of which was brought from Xenia, Ohio, and planted in 1820 by Mr. Thos. Constant who entered the land from the government. Later on, about 1845, the size of the tree, its heavy bearing quality as well as the superior quality of the fruit, attracted so much attention among the old settlers that I observed it more carefully; and in 1862 I bought the farm, on which the tree now stands, from Judge Logan of Springfield, Abraham Lincoln's first law-partner.

I am confident that for the last forty years the tree has never failed a single year to bear a crop of pears, and, to the best of my judgement, it has borne eighty bushels of pears in a season. During the last forty years I have annually eaten pears from the tree, and myself and employees regard them as a very delicious fruit. I have never seen any wormy pears nor a blighted leaf on the old tree, nor any of the trees grafted from it. I regard it more hardy and a more prolific bearer than the natural wild crabapple. In addition to its good qualities as a dessert fruit, the pear is much sought after for canning and preserving, and when sold by my tenants has always brought the highest market price wherever known.

I would estimate the height of the tree, before the top was broken by heavy loads of fruit, to have been over fifty-five feet, the trunk measuring over ten feet in circumference. I have also a number of young trees that are six years old from graft, and three years after setting out in the orchard they fruited. I have also observed the five trees that were grafted more than fifty years ago from the old tree by Mr. Yocum, and find the same characteristics in them that the old tree possesses, long life, hardiness, productiveness and annual bearers, vigorous growth, etc. During these years other varieties of pear, Bartlett, Flemish Beauty, Seckle, Duchess, etc., have been planted in the vicinity and one generation after another of them have passed away but the old tree still stands as a landmark of much interest, especially to the old settlers.

TITUS SUDDUTH.

People regard it as a better pear than any of those named; but I do not consider it better than the Seckle or the Bartlett.

THE PRESIDENT—We will now have an address from the newly elected President, Mr. T. E. Goodrich of Cobden.

Mr. Goodrich, addressed the meeting as follows:

Mr. President, Members of the Illinois State Horticultural Society; Ladies and Gentlemen:

I heard some one remark on my left here, that he is very glad the bachelors are coming to the front; this man says a great many things which we don't have to endorse. But you will have two or three on your Board this year, and if, through their advice and that of the other single gentleman who are your colleagues, this should be your best year, those married men will have to look out for their laurels.

I think I never addressed this meeting with so much reluctance as I do this morning. It is, ordinarily, difficult for me to address a meeting, and when I come to face my fellow members in this society here, where they have honored we with their votes and their friendship and everything that goes with it, it is very hard for me under all these circumstances to talk to you. This is the second time now that you have called upon me to officiate in this capacity, and when I look into your faces and see friends here that I have worked with in this place and others, and in this capacity and other capacities, it is with a great deal of reluctance I try to talk to you. I am very hopeful for the future, but the future depends on those I see in front of me. We want your co-operation. The officers are going to look for your confidence; we hope to get it.

Mr. H. J. Dunlap—There is one thing that should have been attended to before, that of fixing the time of meeting; it was brought before the Executive Board last night, but no action was taken on it. The reports, as published, must contain the reports of northern, central and southern Illinois, and some of them hold their meetings in January, while this is held in December. It has been the custom to publish the volume in January, as early as possible after the State meeting. That necessarily throws some of the auxiliary societies one year behind. Now the Central Society will hold its meeting in January. In the next report there will be the proceedings of two years in each of these district societies, except the southern, and it will be rather stale reading. If it is thought best to hold the annual meeting of this society, say the second week in January, that will

give the other societies time to get their proceedings in and have them fresh. I simply make this statement upon request of the secretary and leave it for you to act upon.

THE PRESIDENT—I have just received a communication from our secretary, Mr. H. M. Dunlap, in which he says he regrets very much he did not recommend this in his regular report. This year we will have two reports of two of the district societies and some time we will have to do this and have two reports, or else have a stale report. If you favor this, I think it desirable to change this right now, and in that way have fresh proceedings in the book every year.

MR. HARTWELL—I see no special reason for locating this State society meeting in the month of January. Why not later than that? My reason for this comes out in my relation to our northern society. There are men who would have attended here, except for having to attend the local society. If you hold it in January, we will have to huddle our meetings together. The Wisconsin meeting is held the first week in February I think; the object of this is to somewhat scatter it through the winter months. They have more meetings. If there is no objection, I should favor the early weeks in the month of February rather than in January. You may say the southern, northern and central societies may hold their meetings the same week. That is not desirable. If we want to draw on each other for matter in the program, we can't do it. We like to spread our meetings out a little, and at the same time not come too near the State meeting.

MR. COTTA—I desire to call the attention of this convention to another point in connection with this question. The Illinois Reports have the reputation of always having been the first ones published of any one year. The record for promptness of this society stands prominent in this entire country. The only thing we have to contend with is the crowding out of our district reports for the next season. I move you that the State society shall hold its meeting the second full week in January and leave it for discussion. I will say this: It will not do to put off the State society meeting until February. If you do the whole proceedings will be stale for the coming season. They want to know what to plant, and for that reason it is well to have the report out as early as possible.

Mr. Fry—The point I wish to make is this: Down in southern Illinois we would like to get this volume not later than the first of February. With us it would have to be that early to get any benefit of it.

Mr. Goodrich—I want to strongly emphasize the point made by Mr. Fry. Although we are old men in the buiness, we look forward to the coming of this volume, and it cannot benefit us if it comes in the spring, Then again we have the legislature; we have to meet with the legislature and we will get around to their time of meeting, and it will be impossible to transact business before the legislature.

Mr. Barnard—I would offer an amendment to Mr. Cotta's motion that it be the third week instead of the second week in January, because the second week is too near the holidays. That is the only reason I have for amending the motion. I think we would have a better attendance.

Mr. Cotta—I accept that amendment.

Mr. Corbin—I seconded the motion of Mr. Cotta, but I will have to withdraw my second, if it is placed at the third week of January. We want the reports as early as possible and I am sure the second week is late enough.

Mr. Fry—I offer an amendment to the effect that we change it to the third week in December.

Mr. Barnard—Make it the second week. It takes from four to six weeks to get out this volume after all the transactions are in.

Mr. Dunlap—I move to lay the whole subject on the table.

The motion being seconded and put to the house, was carried unanimously.

Mr. H. J. Dunlap then read the following report:

To the Illinois State Horticultural Society:

Your committee to whom was referred the award of prizes on the essays on "planting and growing apple orchards in Illinois" would report as follows. We carefully examined the twenty essays given

us, without any knowledge as to their authors and award first prize to essay marked XXX, and the second prize to essay marked 012.

Respectfully submitted,

S. I. MANN,
J. V. COTTA,
T. E. GOODRICH. } *Committee.*

On opening the envelopes containing the names, essay No. XXX was found to have been written by Henry M. Dunlap, Savoy, the writer being entitled to the first prize—a life membership in the society.

The essay marked 012 was written by G. W. McCluer, Horticulturist of the State Experiment Station, Champaign, and entitles the writer to the second prize of five dollars in cash.

GRAPES.

E. A. RIEHL, ALTON.

Mr. President:

The grape will grow and thrive over a larger extent of our country and is less choice of location or soil than other fruit we grow. It will give more fruit and live longer, if properly treated, than any other fruit we have. Every one owing a home, be it only a city or village lot, should and can have grapes in abundance. I have known grapevines to grow and thrive in cities trained to the walls of the houses, that had their roots under the paved walks and streets. One I once knew had its base in the cellar, the house having probably been built over the vine after it had been established. Grapevines trained to buildings are exempt from all the ills they are heir to when grown in the open ground; no mildew or rot ever attacks them when so trained. Just think what a scource of health and pleasure, to the fruit-hungry boys and girls, to say nothing of the children of larger growth of this State, would result from the planting and training of grapevines on the walls of the buildings in this State. Besides the pleasure and profit to be derived from vines as planted they would add greatly to the appearance of many buildings, especially where unpainted, as many of our outbuildings are.

Plant grapes, plant them everywhere on all soils and locations. There is no trick about the planting of grapevines; get the roots well into the soil, and cultivate or mulch when possible.

The pruning will depend very much upon the variety and situation. The first season let them grow at will. The second, cut off all previous growth, leaving only a few buds at the base, and when growth begins allow one or two canes to grow, according to the

strength of the vine. After the second year cut back leaving about half the wood made the previous year. In a paper like this exact rules cannot be given to cover all varieties and conditions; these the grower must acquire in time by practice and observation. As a rule, it is not best to choose the strongest cane for fruiting. A cane from one-third to one-half inch in diameter will fruit better than a larger one; many varieties are poor bearers because they are strong growers and fruit only on small canes or laterals. Others like Ives, Cynthiana and Nortons fruit best on spurs grown from the old wood. Pruning can be done as soon as the leaves fall or even before, and until after the vine has started to grow. The earlier in the fall that pruning is done, the earlier will the vine push in the spring and mature its fruit, so, if it is desired to have the crop mature early, pruning should be done in the fall. Pruning in spring shortly before the buds start is followed by copious bleeding of the vine, which is supposed to weaken it; however, I do not know that this has ever been proven to be a fact.

In vineyard culture I prefer to train on wire trellis, but it having been more convenient to train on stakes I have grown mine mostly in that way. But vines grown to stakes are more compact, preventing free circulation of air and therefore more subject to rot and mildew. Eight feet apart each way has about become recognized as the best distance to plant.

To prevent rotting of the fruit and mildew, sacking or spraying must be resorted to. For home use I would give the preference to sacking. Any one can do it. It is an infallible preventive of both rot and mildew of the fruit if properly done and in proper season. The sacks should be put on as soon as the blossom has fallen; sacking not only prevents rot and mildew but keeps off insects and birds, and preserves the bloom; sacked grapes are so much handsomer than those not sacked that it pays to sack for the improved appearance alone.

For large areas, spraying will have to be resorted to, giving the vines and earth about the vines a thorough spraying with a strong solution of sulphate of copper before growth commences, and later three to four sprayings of the Bordeaux mixture.

The best varieties to plant will depend somewhat upon the location of the grower and what they are intended for, whether for wine, market or home use. If for market, much will depend upon the location of the grower and what market he proposes to supply. While it is absolutely necessary that the varieties be hardy, healthy and productive and the fruit of good size and appearance, it will not do to lose sight of quality. Nor will it do to be too nice in one's standard as to quality. There are those who call the Concord and

Niagara coarse and foxy; but the great mass of the people, the public who buy grapes, think them good enough, and their thinking so makes it so for the practical grower. In the southern end of this State, we make the most money out of the varieties ripening before northern and eastern grapes come onto the market and nothing later than Concord or Niagara should be grown unless one has a local market to take his supply, to do which the grapes grown must be of a quality to successfully compete with the cheaper Concords shipped in from the north and east. I have learned of several growers in southern Illinois who sold their crops of Goethe in local markets at ten cents per pound when shipped-in stock was selling at two and a half to three cents. These markets, however, and the quantity that can be sold in them are quite limited.

For market Moore's Early is the best early grape we have. Concord is rather too late with us, especially if cropped too heavy. Worden is a little earlier and of better quality, selling in the Chicago market for ten cents per basket higher than Concord. But it has the bad fault of cracking in wet weather when ripe or nearly so, and in handling, being even worse in that respect than Concord. The farther south you go the worse this fault seems to be. At Villa Ridge I am told it is so bad that it cannot be shipped at all. The quality, however, is so excellent that it should be in every collection for home use.

I have found Wilder the best black grape I have ever grown, both for home use and market. The bunch and berry are large and handsome, the quality is excellent, and has the advantage of Concord and Worden in not cracking from wet weather or in transportation.

In red grapes we have nothing that is entirely satisfactory for market purposes. Woodruff comes the nearest to it. It is not a good grower with me and is apt to drop from the stems when shipped. I think, now that we have learned to spray, Lindley may prove a good red grape with us.

In planting for market confine yourself to a few well tested varieties; procure and test all promising novelties, but only on a small scale, and do not be carried away by the first favorable fruiting, nor condemn a variety if it does not come up to your expectations the first year. It takes several years' trial to determine the good or bad points of any fruit.

For home use plant many varieties, from the earliest to the latest. I advocate the planting of many varieties for several reasons. Some seasons some varieties will do well, while other seasons others may do better. The matter of cost, too, does not cut

so much of a figure, a small crop of extra quality being prized more by persons of cultivated tastes than a larger crop of inferior quality.

In the south half of the State the Goethe should be in every collection. It is one of the latest and best, and sacked will keep a long while on the vines in splendid condition, or rather I should say *can* be kept. With me they don't keep very long. The quality is so good that the supply is never large enough to allow them being kept very long.

Norton's Virginia and Cynthiana are usually classed as wine grapes, but many have learned that they are excellent table grapes as well, and being late and good keepers gives them an added value for our section.

I have fruited several of Munson's new productions and am well pleased with them. Some will no doubt be improvements upon varieties we now have. Among those fruited I may mention the following as especially promising: Big Hope, bunch very large, berry medium, black, quality and texture excellent, immensely productive; Hopkins, a seedling of Cynthiana, much like it but larger and apparently more productive; Fern Munson, black, bunch and berry large, quality very fine, late, and for that reason desirable with us; Beacon, is early and probably desirable for the north; it has shown a disposition to crack in wet weather, which is a serious objection with us.

I have fruited the Prairie State, originated by Jacob Christian of this State, two seasons, and find it, next to Niagara, the best white grape we have. In the northern part of the State, where the Niagara is not so good as with us, it may take first rank. It is more hardy than Niagara, fully as productive, and has better staying qualities than any other white grape of Concord parentage with which I am acquainted.

DISCUSSION.

Mr. Guilford—I would like to ask what experience you have had with the Moore's Diamond. It promises to be the best white grape we have. It has some peculiar qualities. When it is ripe it is almost too sweet. It is the sweetest of all grapes—sweeter than the Delaware. It promises to be a fine bearer. It bears equally as well as the Concord. It is a solid, hard bunch, a good deal in the form of Moore's Early, and I think it is going to be a good grape.

Mr. Riehl—The Moore's Diamond I have fruited, and while it is well recommended in the east, and is probably all right in Iowa, it is no account with us, for the reason that while it is a good grower

and a fine bearer, fine bunches and of good quality, it has this bad fault—it wilts on the bunch before it is fully ripe, and by the time you think you have some fine grapes you have nothing.

THE PRESIDENT—We have one of our oldest members with us, and we shall all be pleased to listen to an address from him. I have the pleasure of introducing Mr. Minkler.

Mr. Minkler then addressed the meeting as follows:

Mr. President, Members of the Illinois State Horticultural Society, Ladies and Gentlemen:

I will say *brethren* of the Illinois State Horticultural Society. You seem to me like brethren. Before there was a survey, before there was a road, before there was a bridge, before there was a schoolhouse, before there was a county in all northern Illinois, I was here. And I think it was in 1852 I met here with the other brethren and we formed a State Horticultural Society. I was one of its charter members. There are only three of us left of that number, and now, when I look over your work and think what you have done in that time, it is wonderful. When you look it all over and see how you have brought things to a focus and put things in a tangible shape, it is a marvel. Where were your nurserymen and fruit growers who were ransacking the whole world to find something that would stand our climate? We experimented on eastern varieties for fifty years trying to get something that would suit our purpose. It was not but a very short time until you found out that all these were of no use whatever. You have now demonstrated that you know what to rely upon, to depend on, for your orchards and your other fruits.

Now, in all this, I wanted to "rake down" the blue grass, but I have not time to do that. We have just found out what varieties will pay for Illinois. You plant your orchard and then send men away over to Russia to get something that will stand the disastrous effects of your own misdemeanor, to stand your vicious climate. Those that are tough enough to stand your own neglect and illtreatment will survive and the rest all go to waste. I repeat what I said yesterday; I will give ten dollars for an orchard that has been cultivated for five or six years in succession. Your orchards are starving. Go through an orchard and ask of the apple tree, "How long have you stood there?" "Thirty years," it will say. "How many crops have you pro-

duced"? "Well, so many." "What have you had to live on all this time?" Blue grass. Blue grass." "What else do you do besides bearing fruit?" "Oh, I keep the horses and the cows and the hogs, and the sheep." "Have you ever had any top dressing?" "No, never had anything but blue grass for all my trouble."

Now, when I look back and see your mission and what you have done here in Illinois, I rejoice that it is my brethren. I don't expect to meet with you again, for they say we are getting old; that is a mistake, we are only getting ripe. We are getting ripe and these younger men have to keep up this work and go on in it. Your work is itinerant, it is missionary. Every member is an intinerant. He pays his own railroad fair, his hotel bill, his membership fee, comes here and spends three days and goes home. How much does it cost you? Not less than ten dollars. And you get the volume in which is published all these transactions. I think I have the full set all the way through and I think it cost me ten dollars a volume; and still, we cannot get people to appreciate that volume. In that, all is recorded and you get the opinion of the best horticulturists in the United States. Mr. Barry told me that he considered the best publication, which was published on this subject in the United States, is that Illinois report. This is your mission. You have just learned what to plant. Don't go to planting everything that comes along. I am so glad we have gotten down to twelve to fourteen varieties and know just what to do. A man can now go to market with a load of apples of an entire variety. Now you know what to plant and where to plant.

Mr. Galusha, Mr. Edwards and myself are the only charter members left and the society has always been very dear to me. I think we have been working for the future generations and that is our aim and object of life; it is to live so that the world may be the better for our having lived in it; to say that we have done something that our posterity may look back upon with pleasure.

And now, brethren, as this is my last meeting with you, I want to bid you farewell. You carry on this work; this itinerant work. It costs you something, but now you have something for it. The place to begin is to know what to plant. I would not plant more than ten varieties, if I were putting out an orchard. When I was a boy, somebody planted a tree, and I said "I am going to eat apples off of that," and I had a pie off of it this year. If I live to next year, I may see

you; if not, brethern, I leave this work in your hands. Fight well the good fight of faith; lay hold on eternal life. Why, you have got the best country in the world. It is all fitted up for you. The like was never known equal to northern Illinois. I was in a car with Judge Hitt one day and I said to him, "Judge, you have been all over the world, and the islands of the sea and around the world and I want you to tell me where is the best place." "Well," says he, "I have never seen but one northern Illinois." Everything is here to your hand; water power, steam power, brain power, and all the power you want, all that is necessary to make this country the best in the world. If you want a president, we have all the timber that you want, anything that you wish. It is for you to attend to it. Hand this society down to your posterity, so that your children may rise up and call you blessed. Gentlemen, I thank you.

MR. H. J. DUNLAP—Although I am not a very old man, I remember very distinctly when this society was organized. My first recollection of Brother Minkler was when the Northwestern Fruit Growers Society met in Chicago, in the market house on State street. At that meeting were present, if I remember correctly, Dr. Pennington, F. K. Phoenix of Bloomington, Arthur Bryant Sr., A. R. Whitney, Robt. Douglas, my father, M. L. Dunlap and Dr. Kennicut. At that meeting there was a large exhibit of fruit and although it was in 1852, it was one of the finest I have seen in the West. I was also present at the Alton meeting of the State Horticultural Society in 1858, and perhaps after that I was at all the meetings until I reformed and quit being a horticulturist.

MR. BARNARD—Mr. Moore has an apple which he wishes to speak of.

MR. MOORE—In a peach orchard I have, that I have been gathering fruit from for years, I found this apple. I bought them fourteen years ago of Charles Wambly. I thought it was a fall apple; they said it was a fall apple but I find it is a splendid winter apple, and it is a beautiful tree. I call your attention to it for I have been working hard for years to find a good winter apple in northern Illinois. I had a seedling from the winter Pipin and I top-grafted it but it was killed. Mr. Cotta of Freeport can give you a description of this apple. It is called the "Melinda."

MR. COTTA—I am not so well posted on this variety. I saw it in the fruiting from four to six years ago, and it bore then, as heavy as the Ben Davis bears when it is heavy and the fruit was more uniform in size than the Ben Davis. The tree forms a spreading top, and I do not think it has been disseminated very much. We have several trees now, I don't know who else has.

MR. DUNLAP—I believe Mr. Moore has a $10,000 apple tree there.

MR. COTTA—A good many years ago Mr. Wambly called my attention to it. He got some scions from somewhere in Minnesota. It has grown up there in a similar way. We have only a limited number of trees in the nursery, but we did not know the value of it until recently. There is a tree that is called Best Polo that does remarkably well, and the owner of it called my attention to it and requested me to propagate it.

THE PRESIDENT—Now, here is something that has been brought to our notice. I don't know how much merit there is in it, but it seems our committee ought to take it in charge and investigate it. Here is a winter apple we can grow right here, and our committee ought to visit it and see what the character of the fruit is, the hardiness of the tree, etc. Should not we have it sent to the experiment tation?

MR. HARTWELL—I wish to present a resolution which is of more importance to southern than to northern Illinois, and I see no reason why we should not enter into it. It is a movement on the part of the commission merchants to league together and protect themselves and the fruit growers. Mr. Barnett of Chicago was on the program of the Northern Society with a paper, and I see no reason why we should not be in sympathy with his resolution. This is called the National League of Commission Merchants of the United States and Mr. G. W. Barnett of Chicago is president.

Mr. Hartwell then reads the following resolution:

WHEREAS, the business of marketing of fruit produced is an important matter, that requires the attention of every horticulrurist; and

WHEREAS, the experience of many is that there is need of safeguards to protect the ignorant and the unwary; therefore be it

Resolved, That the State Horticultural Society of Illinois welcome any agency that will make more secure the results of our labor.

Resolved, That this Society endorse the objects and principles of the National League of Commission Merchants of the United States, as set forth in its declaration of principles, and recommend the League as an agency that will aid in correcting abuses in the commission business.

Resolved, That a copy of these resolution be sent to the president of the League at Chicago.

MR. RIEHL—Mr. President; I have no doubt it is all right, but I do not want to endorse a thing I know nothing about.

MR. MCCLUER—I think if we change one word in it, we might endorse it. It says it is a league that "will" correct certain abuses. If we change that to "may," it *may* correct them; we do not know that it *will*.

MR. WINN—I have been through the mill, when it comes to commission merchants. I got "skinned" by a firm that advertises through one of these papers. One of the men was one of these firms. I do not endorse anything of this kind.

MR. GOODRICH—I am exactly in the position of Mr. Riehl. I know Mr. Barnett; I know him to be a gentleman and I would not hesitate to risk my goods in his store. But when we go out of our way to endorse some scheme of the commission men, we are not wise. We look upon that with very grave suspicion. I think we ought to consider that very well, before going into it. I move you, therefore, that the whole matter be tabled.

The motion to table was put and carried.

At this point the meeting adjourned until 1:30 P. M.

AFTERNOON SESSION.

Thursday afternoon the meeting was called to order at 1:30.

Motion was made and carried to adjourn the meeting at 3 P M, owing to the fact that most of the members were to leave during the afternoon.

DISCUSSION ON MR. RIEHL'S PAPER.

MR. RIEHL—While I do not want to criticize myself, there is one thing I want to speak of. It came up before and it will come up later. In a great many sections of the country, Moore's Early is

objected to as being a poor bearer. Wherever that is the case, it is the fault of the cultivation. It needs good cultivation to show what it is. In the matter of unfruitfulness; it does not fruit at all on heavy canes. The canes should be quite light; when so fruited, it should be good. It does not make any difference whether they are from sprouts or canes; the wood that is selected for fruiting must be small, much smaller than in any other variety.

MR. DELAND—There is one thing I have read in regard to the place to plant them. The article said that anybody who had a south side wall could raise a grapevine. I have been testing it. Put it on the south side of the barn where the sun strikes it at a temperature of 120° and I ruined the grape both years. I got this information from the *Rural New Yorker*.

MR. RIEHL—Many say the west side, and some say the east. Every person will have to look out for himself as to which is the best side. If I had to plant out a grapevine, I certainly would not put it on the north side; I would put it on the south. It is a fact that you can grow certain varieties on the walls of buildings that you don't grow elsewhere. You can grow them so long as you don't have the root killed by root lice. Of course a vine that is sheltered will do better than one that is not. I have known that as long as I have known anything. It is a wonder that everybody does not know it, and that everybody that has a building does not grow a vine on it.

CHERRIES AND PLUMS.

W. S. PERRINE, CENTRALIA.

Mr. President:

It has been said "The fruits of a successful life grow on the tree of economy." We might almost be allowed to change the adage, and say instead, the fruits of success grow on the trees of cherries and plums, if we would but plant them, and try for success. But these fruits are not cultivated in the west as generally as they should be, or as we prophesy they will be in the near future.

People are too much like a flock of sheep; where one goes they all go.

In a locality, if a few men plant strawberries and make them pay, everybody plants strawberries and nothing else. In another section, if a few men, having apple orchards, get two or three good crops with

even fair prices, it is quite difficult to supply that section, for the time being, with enough apple trees to plant; for the people *all* want to grow apples, and they will plant almost nothing else.

The commercial fruit grower should turn part of his attention to the somewhat neglected fruits, but only to those he knows will thrive in his locality.

THE CHERRY.

The orchard should be planted on land with good natural drainage, or that which can be thoroughly drained. High dry land is better than low moist land; even if the latter can be well drained. A sandy loam is thought to be rather better suited to the cherry than heavy soils.

Plant first-class two-year-old trees, pruning the roots with a sharp knife. Cut the top severely, leaving not more than three or four leaders, and cut these back to within from four to eight inches of the body of the tree. People are apt to leave too much top on all newly planted trees. This is especially disastrous to the cherry.

In sections where the winters are comparatively mild, fall planting is better than spring, but whether planted in the fall or spring, the planting should be done thoroughly by firming the soil around the roots, the tighter the better. The cultivation of the orchard should be constant until after the trees have begun to bear. Our young bearing orchard we plow after the fruit is gathered, and then again in the late summer. Plow as shallow as possible, and still turn under the grass and weeds. This cultivation keeps the trees in a vigorous condition so as to ward off the attacks of the bark beetle, etc. The trees are also in a condition to set heavily with fruit buds, and to bear a full crop of fine fruit the following spring, if conditions are favorable.

The birds take a great many of the cherries, appropriating the entire crop if it is a light one. Some men make a practice of killing these feathered thieves, as they choose to call them, during the cherry season, but this we believe to be a great mistake and should not be allowed. The birds do a great deal more good than harm, and by planting more trees we can raise enough cherries for ourselves, and the birds as well.

In our section the Early Richmond is the only variety planted for commercial purposes. We are testing other varieties, some of which we hope will prove valuable. The large Montmorency gives great promise.

We market in the same package we use for strawberries—the twenty-four quart case. The packing season comes just at the close of the strawberry season, so that we can use the berry pickers for picking the cherries; can use the same package, the same picking baskets, and the same packing shed. Thus there is very little additional preparation or labor to marketing the cherry crop.

PLUMS.

Plums should be planted on moist heavy lands, but they will grow almost everywhere. The trees will thrive with less care and rougher treatment than the cherry.

Our plum orchard is planted sixteen by fifteen, but will plant next time twenty by ten or twelve feet. Plums thrive under close planting, but the rows ought to be far enough apart one way to give passage way through them. The plum orchard should become the hog pasture, for hogs grow fat on plums, and are better than any spraying machine to keep the curculio—the great enemy of the plum grower—in check. There are many almost equally desirable varieties of plums, and we think several varieties should be planted to obtain the benefits of cross fertilization, for, with the plum, this is quite important for best fruit results.

The following is a good list, according to our experience and observation. We give them in the order of blooming, and think they should be planted in about the same order. Botan, Ogon, Miner, Wolf, Wild Goose, Wayland, DeSoto and Golden Beauty. Would plant more of Miner than anything else. The most of these varieties are fine for cooking. The public do not appreciate the plum as they should, and when they do, its production will become very profitable. The Miner and other varieties cook perfectly, and are excellent made into sauce, butter, jelly, etc.

When we market the plum at a distance we ship in the strawberry case and boxes. In the near future we hope to see the fruit industry so developed, and along such lines that there will be less often these periodical times of great over-production, and, along with the development of the plum industry, and others, must come establishments for working up at home our inferior and surplus fruit into finished products. In this way we can oftentimes relieve the green fruit market by converting part of our fruit into a different and perhaps a more valuable form, and into a form that can be held if desired. This is one line of development for the future. Let us be progressive, remembering that "Success worth having, is success hard won."

DISCUSSION.

MR. BARNARD—Will you please describe the Miner?

MR. PERRINE—The plum is not so large as the Wild Goose. It is red, a little darker red than the Wild Goose.

MR. GUILFORD—In speaking of any varieties of plums, we ought to see all sides of the question. This Ogon and the Abundance might be one and the same thing for all I know. I should like to ask

a question of the writer of that paper, or any other nurseryman—if he has ever seen the Abundance fruiting in this State, and what counties he has found it in? I have heard a great deal of talk about it; but who has seen it; and under what conditions; and how far north?

MR. PERRINE---You will find the Abundance and the Ogon fruiting out a little east of Centralia. I have not been there during the fruiting season, but a gentlemen who has tells me it is very good; he has it and thinks quite a good deal of it. They are somewhat subject to blight; more so than some of these other varieties. We have not fruited it ourselves.

MR. GOODRICH—Did you ever notice any black knots on the limbs?

MR. PERRINE—No, but I have noticed it on the Sweet Melton and the Ogon.

MR. GUILFORD—What stock had you employed to work those plums on?

MR. PERRINE—I don't know what the best stock would be.

MR. GUILFORD—I have been growing plums for a number of years and I have always been a stickler for the native plums. I plant them by the bushel and I find, in running them out, that some of them are the size of a lead pencil and others are a little better, all gathered from the same tree. I find we have five to six-foot trees in one year's growth. If we plant the Mariana we have a uniform stock because it grows from cuttings. The Mariana has not been introduced more than ten or twelve years. Some of the fruit growers deem it good stock for a peach. Is it favorable for the plum? There is another thing about it. It is good for stock for some of our flowering shrubs, such as the "Flowering Almond." It makes a beautiful little bush. I was showing it to a gentleman. I took my Mariana buds there and as soon as he saw it he pronounced it to be a cherry. I said, "No, it is a plum." He cut a twig off of it and convinced me that there was not a bit of a plum about it, that it was a cherry. It is a cherry in bud, in blossom, in formation of the fruit and a cherry every way you take it, and the fruit is more like a cherry than a plum. The plum is, of course, not fit to eat. Now, this is very important because nineteen-twentieths of the plums you buy at the nurseries are going to be on these Mariana stock.

Mr. Perrine—Whether the Abundance will do well we can only tell by experience. It is certainly a vigorous grower and certainly very hardy with us. The stock of the cherry worries me more than that of the plum. Our ordinary stock seems to be a little short-lived for the cherry, and I don't know what we are going to do about it. Our cherry trees are not lasting as long as they should. They seem to be going down in various parts of southern Illinois and we want to look around for another.

Mr. Warfield—I want to say a word about cherry stocks. I have an Early Richmond cherry tree on my place and it has been there a long time. It is worked on an old common Morello and it seems to be fine; whenever any fruit tree bears, it has cherries on it.

Mr. Guilford—We heard of a man in one of our counties who got in a lot of English Morellos, and he had a surplus of them and worked them on the Early Richmond, but the Richmond is hardier than the Morello. It is of no use for stock. I have a tree; it is a wild cherry. I got my plants from a man up in Wisconsin who propagated from the seed. They grew that whole first year. It was a very strong grower. That was my first experience in budding it. The Richmond takes very slowly on it, but all those Russian varieties take rapidly and well. Out in western Iowa and in the northern part, they claim it is really making good stock for the cherry. It belongs in northern latitudes, in the home of the native pine timber. It fruits just exactly as our common cherry does, and it will probably be a very good cherry.

Mr. Augustine, having vacated the chair to the incoming president, moved that Mr. Goodrich's paper be referred to the secretary without reading and it was so ordered. The same action was taken with the report of Mr. Bryant.

PEACHES AND PEARS—GROWING AND MARKETING.

T. E. GOODRICH, COBDEN.

Mr. President:

Peach growing is a satisfactory and reasonably profitable venture, in any part of Illinois, when seven crops can be grown in ten years. Seven in ten, will pay to plant trees; but the reverse of that, three in ten dig, them up. Ten years is about the limit of profitable

bearing age of a peach tree. As a rule they should be dug up after that time, although there are notable exceptions to the rule.

If the ground selected for a peach orchard is level, plant trees in rows both ways; if side hill, circle the hill and plant in rows one way. In either case, give each tree 400 square feet, the equivalent of 20x20 feet. It is best to grow a cultivated crop in the orchard, if it can be done without barking the trees. Four crops grown between the trees will pay the cost of the trees, planting, rent of land, taxes, delivering the orchard to you free of cost; and paying a profit on the crops beside. The trees will be large enough, the fifth year from planting, to bear. Unlike a pear tree, a peach grows all autumn and rapidly attains full size.

Very little trimming is needed, other than to give the tree shape, and to keep it headed high enough to be out of reach of the heads of men and horses, in plowing and picking. I have tried barnyard manure, and nearly a dozen kinds of fertilizers, and find all very beneficial to growth and fruit. It is my custom to sow rye in fall or winter to be plowed under in summer. In years when not in bearing, a crop of cow peas or other green crop can follow the rye. I do not consider irrigation either necessary or important in any part of Illinois. Any kind of summer mulch would be a harbor for insects and fungus, and consequently a detriment to the orchard.

A list of varieties will not be given here, for the reason that no list could be named that would fit the entire State of Illinois. Many things depend upon one's market, distance to be shipped, etc. A gentleman living in southern Missouri told me, not long ago, that late varieties paid him much the best, and he now had those exclusively. His market was St. Louis. Others living in the range of Michigan's competition will do well to select early varieties that will be out of the way before that State begins to ship.

As to varieties I will only give a few general suggestions. Don't plant the Hale's Early, Amsdens, Waterloo, Shumaker, Briggs May, or any other of the Hale's type. They will disappoint, cheat and jilt you. They would rot if planted in the Garden of Eden. The Wheatland, although a large, handsome, and luscious fruit, is so shy a bearer with me as to fail to pay ground rent during the six years I had it. Would also discard Silver Medal, Gearie's Hold On, Switzerland and Late Crawford. In selecting varieties, apply the following tests in about the order given. Hardiness, quality, size, productiveness, and somewhere in the list would place good looks. A great deal depends on selling qualities, and one of the foremost ones is appearance.

Some varieties I would discard for that reason. I once had a block of Ward's Late; they were a dull dirty white, mixed with green, and were decidedly unattractive and almost unsalable. I gladly dug them out. Clingstones are not desired in the market, only for a special use; consequently the sale is very limited.

The best climate for the ripening of peaches is dry and warm and, like that of California, almost entirely free from moisture. The best peach years of which I have knowledge have been the ones when the gauge indicated the least amount of rainfall. Moisture is the parent of rot. In a dry season, the yield is a greater per cent of merchantable fruit, and of a much better average quality.

It is also more showy, and carries better. Of the peach packages I have tried, I prefer the four basket crate originated and still made by our dealers at Cobden.

Of late years I have discarded the colored tarlatan as a covering for the fruit. Often the peaches are much handsomer than the cloth that hides them. The old adage says "A perfeet arm needs no bracelet."

PEARS.

Plant standard pears 16 x 18 feet; dwarfs about 10 x 10. Cultivate with a hoed crop for the first three years; then, if the trees show signs of much injury by blight, cease cultivation and seed to grass. If the varieties selected are not liable to that disease, cultivate as steadily as for apples or corn. When trees begin to bear, there will be constant exhaustion of tree and soil. To remedy this, manure. I have this full, broad casted manure in all my young pear trees, and plowed it in with a two-horse plow.

One of the best tools for the cultivating of all kinds of trees is a reversible cutaway harrow. It works the dirt to and from the trees at will. It is easy, rapid and thorough.

When planting the trees, be sure and cut them back enough to ensure their living. After that, except to cut out blight, the less a pear tree is cut the better.

I have had trees so "scientifically pruned" as to be of very little use to me ever afterward. Dame Nature is wise because she is old and has some idea of what a bearing fruit tree ought to be. Remember, a fruit tree is not an ornamental shrub, and need not always be shaped by rule. Beware of a professional tree trimmer out of a job. I keep my trees to bear an abundance of good fruit. If they will do that, it is not my place to criticise as to the how. The trees have the largest share of the work to do and I must help and not hinder.

Blight is the most fatal enemy of the pear tree. Yet I am not sure but it is a blessing in disguise. For if all the trees planted in the last thirty years had remained free from it, their fruit would not now be worth the picking. If blight appears cut it out and stop cultivating. The following varieties are very prone to blight, and for that reason I have discarded them all together: Bartlett, Osborn's Summer, Louise Bonne, Bessemanka, Sepinganka, Souvenir de Congress, Idaho.

For inferior quality of fruit, and other reasons, would drop LeConte, Burket and Garber. I would plant very sparingly of Wilder, Early Harvest and Lawson.

After picking allow to ripen a few days in a fruit house before packing to ship. Of packages, I prefer kegs or barrels; they keep in a fresher condition, and are not so liable to theft while in transit.

LIST OF FRUITS RECOMMENDED.

FOR NORTHERN ILLINOIS.

APPLES—For Market:

Summer—Yellow Transparent, Duchess.

Fall—*Maiden's Blush, Wealthy.

Early Winter—*Jonathan, Pewaukee.

Late Winter—*Willow Twig, *Ben Davis, *Minkler.

For Family Use, add:

Summer—*Benoni.

Fall—Snow, *Cayuga Redstreak, Wolf River, Longfield, *Ramsdell-Sweet.

Early Winter—*Grimes' Golden, *Roman Stem.

Late Winter—*Salome.

CRAB APPLES—Whitney, Hyslop.

In the northern part of the district it is recommended to top work varieties marked with a star (*) on extra hardy, congenial stocks.

Relative value of each variety is indicated by the relative number of trees in a commercial orchard of one thousand trees:

Yellow Transparent 50, Duchess 100, Maiden's Blush 75, Wealthy 75, Jonathan 200, Pewaukee 100, Ben Davis 150, Minkler 100, Willow Twig 150.

Circumstances might vary the above list very materially.

Value in an orchard for family use of one hundred trees.

Yellow Transparent 3, Duchess 5, Benoni 2, Whitney 3, Hyslop 2, Wealthy 5, Maiden's Blush 5, Snow 5, Cayuga Redstreak 5, Wolf River 3, Ramsdell Sweet 2, Longfield 5, Jonathan 10, Pewaukee 5, Grimes' Golden 5, Roman Stem 3, Ben Davis 8, Willow Twig 10, Minkler 7, Salome 7,

Summary: Crab 5, Summer 10, Fall 30, Winter 55.

PEARS—Bartlett, Flemish Beauty, Seckel, Keiffer.

PLUMS—De Soto, Wolf, Lombard.

CHERRIES—Early Richmond, Montmorency.

GRAPES—Moore's Early, Worden, Concord, Niagara.

RASPBERRIES—*Black*-Kansas, Ohio, Older. *Red*-Turner, Cuthbert.

For Family and Local Market, add:
Shaeffer's Colossal.
BLACKBERRIES—Snyder, Ancient Britian.
CURRANTS—Red Dutch, Victoria.
GOOSEBERRIES--Downing, Houghton.
STRAWBERRIES—Crescent, Bubach, Warfield.
For Fertilizers, Capt Jack, Dayton.

DESCRIPTION OF VARIETIES.

APPLES.

Yellow Transparent—Tree hardy, upright grower, strongly limbed. Fruit a beautiful yellow, and as its name indicates almost transparent, medium size.

Duchess—The commercial early apple for northern Illinois, should be in every orchard; bears young. Fruit fair, good size, ships well, sells well.

Benoni—Tree upright grower, considered hardy, bears heavily alternate years. Fruit red-striped, sub-acid, fine flavor, small for market. Valuable for family.

Whitney Crab—Tree upright grower, very hardy, bears young. Fruit large, handsome and fine for dessert or canning.

Hyslop Crab—Tree perfectly hardy. Fruit very large, deep crimson, valuable on account of its lateness.

Maiden's Blush—A beautiful apple yellow with blush, medium size, juicy, sprightly acid. Regular bearer. Valuable for family and market.

Wealthy—Originated in Minnesota (where it is a winter apple), very hardy, productive. Fruit red striped, full medium size, good quality, inclined to drop early.

Snow—Perhaps no variety has stood the severe winters better than this. Tree spreading, vigorous grower, bears heavily alternate years. Fruit medium size, red striped, very white flesh, not rich, but pleasant flavor, very juicy.

Cayuga Redstreak—Very large, yellow striped with red, good quality, regular bearer.

Wolf River—Tree a strong grower; fruit large, greenish yellow with red, sub-acid.

Longfield—Tree hardy, heavy bearer; fruit medium size, yellow with blush, good quality, not solid enough for a good shipper; has been classed with winter apples but is only a fall apple here.

Ramsdell Sweet—Tree an upright grower; fruit medium size, bright red striped, flavor rich, and very sweet.

Pewaukee—Tree hardy and productive; fruit medium to large, dull red striped, sub-acid, good quality.

Jonathan—Tree does not stand extremes in weather as well as some, good bearer but requires manuring for best results; fruit has all the qualities essential for market or family use, good size, rich red color and fine flavor.

Grimes' Golden—Fruit medium size, yellow, fine quality. Not a heavy bearer; fruit matures early.

Roman Stem—Has a good reputation for hardiness. Fruit medium size; rich flavor.

Ben Davis—Tree a vigorous grower and early bearer, but inclined to be somewhat tender, hence the suggestion to top work in northern Illinois. Fruit large, handsome, red striped, medium quality, grown largely for market.

Salome—Tree hardy; fruit medium size, yellow with red, quality good, keeps well.

Minkler—Tree hardy, vigorous grower, and needs plenty of room; fruit large, red and green, fine quality, good shipper.

Willow Twig—Has been the money-getter in many localities, on account of its hardiness, productiveness, keeping qualities and size; fruit greenish yellow with red stripes, sometimes highly colored, good shipper, quality second rate.

PEARS.

Bartlett—Fruit good size, juicy, rich but rather peculiar flavor. A very popular market variety.

Flemish Beauty—Fruit good size, rich and juicy. In many localities has been one of the most reliable varieties.

Keiffer—Tree a strong grower and unusally free from blight; early and prolific bearer. Fruit large and of good quality when properly ripened.

Seckel—For richness of flavor nothing surpasses this little pear. Color yellowish brown with reddish cheek; considered a good bearer but too small for market.

PLUMS.

De Soto—Fruit medium size, early and abundant bearer.

Wolf—Tree a vigorous grower and hardy. Similar to De Soto in color size and quality.

Lombard—Good size, good quality and productive. Popular market variety.

CHERRIES.

Early Richmond—Medium size, dark red color, juicy, acid, productive. The main reliance for a crop.

Montmorency—Larger and later than the Early Richmond. Desirable for a succession.

GRAPES

Moore's Early—A hardy vine, season very early; fruit black in color, quality good

Worden—Resembles the Concord but is ten days earlier and better flavored. Should be planted to make a succession, if not for main crop.

Concord—Long called the "grape for the million" and should be selected where only one variety is planted. Hardy, productive. Color black; season medium.

Niagara—A large white grape, hardy, productive and fruit of fair quality; bunches large and compact, good shipper.

RASPBERRIES.

Kansas—Large and prolific, quality good; season early.

Ohio—A great producer; fruit medium size, largely grown for canning and evaporating.

Older—Large coal black color; season medium, exceedingly prolific.

Turner—Not a rank grower, generally productive; fruit excellent quality, medium size, early.

Cuthbert—Berry large, conical, bright red; firm, prolific, late.

Shaeffer—A strong grower, hardy, prolific; fruit large, purple, late; good canning berry.

BLACKBERRIES.

Snyder—Generally hardy and productive; fruit medium size and a good shipper.

Ancient Britian—Very prolific, larger and later than Snyder, quality good. Valuable North.

CURRANTS.

Red Dutch—The old stand-by; fruit not large but abundant.

Victoria—Medium to late season; large berry, productive.

GOOSEBERRIES.

Downing—Fruit large and not liable to mildew; productive.

Houghton—Fair size berry, bears regularly and heavily.

STRAWBERRIES.

Bubach—A strong grower and a very large berry; productive but requires good soil and cultivation. Adapted for home market.

Warfield—Medium size, fine flavor, berry firm and a good shipper. Plant a vigorous grower and productive.

Crescent—Good size, a good bearer and good quality, Plant a strong grower; for family use and home market.

Capt. Jack—Medium to large size, color dark red, fine flavor and solid. Strong grower and productive.

Dayton—Prolific, strong grower; color bright red, quality good.

Respectfully submitted,

L. R. Bryant, J. V. Cotta. } *Committee.*

REPORT OF DELEGATE TO MISSOURI STATE HORTICULTURAL SOCIETY.

T. E. GOODRICH, COBDEN.

Mr. President:

In response to a letter from Secretary Dunlap, I attended the meeting of the Missouri State Horticultural Society in session at Trenton, Missouri, December 4th, 5th and 6th.

I was well and pleasantly received. They honored the Illinois Society by honoring its delegate which you know is according to scripture. It also showed that our society had a good reputation

abroad. Mr. Dunlap had requested them to fill me up with good things —good things horticulturally, and send me back to tell the story. Well, they did fill me up with good things, or at least as far as a three days' flow of eloquence could do so. If I fail to convey to you a good report, the fault will be mine and not theirs.

The meeting was composed of regular and honorary members, and delegates from Kansas, Michigan and Illinois. Papers were read on the subjects of flowers; experiment station work; diseases of trees; care of newly planted trees; varieties; peaches—hardiness and cultivation.

Grapes were treated by four papers, under the heads, viz.: The vineyard; seedlings; breeding new varieties for money; and pruning and spraying.

The stone fruits, different varieties and cultivation. Irrigation was given a prominent place on the program, and was treated by two papers. Very copious discussions were had on the topics of spraying, cultivation, trimming and varieties. The discussions were frequent, exhausted, and spirited. The participants were not always agreed, and I thought of the old adage, "Many men of many minds" and could easily imagine myself in our society, so varied were the opinions and theories expressed.

The preference of a large majority of the members, as indicated by the discussion, was in favor of low and spreading heads for trees of nearly all kinds, and especially apples. Preferences were expressed for a shorter distance apart for apple trees; forty and fifty feet would be reduced to thirty-three and twenty-five; and a few planters would reduce to sixteen feet. It was conceded that low heads and close plantings tended to heavy crops and overbearing, consequently short lived trees. But this method was preferred, with the intention of replacing the orchard, when it begins to fail, with new plantings.

Whole and piece root was considered, but experiment, as far as given, seemed not to indicate a more favorable result from whole than piece roots. Members agreed that the demand for early apples was not great, and markets easily supplied, especially as they must be put on the market in competition with summer fruits. I came to the conclusion that, of the apple trees now in bearing, and those that will begin to do so within five years, in the State of Missouri ninety per cent are winter varieties.

On the subject of spraying, the experience given, showed a wide range of results; from no benefit perceptible, to a perfect success. But fully eighty per cent of the experiments could be considered successful, as a prevention of codling moth in both apple and pear. A few instances were reported of success in spraying the stone fruits for curculio. Spraying fruit trees was advocated in winter and early spring, during warm spells, to kill fungous spores.

Two papers on irrigation, one of which was an account of a method used on strawberries last season near Kansas City. Water was purchased from the city waterworks at fifteen cents per 1,000 gallons, and applied to the surface by pipes, at the rate of one gallon to twenty lineal inches of row. The cost of a flow of water was ten cents an hour. The waterings were applied at night, and one week apart. The cost of pipes, water and labor was $70; the crop was 225 cases, from what I understood was three-fourths of an acre. From another piece, about the same size, not watered, the yield was seventy-five cases, selling for $1.50 a case. Those watered, from their larger size and better appearance, sold at $2.40 a case, making a net profit in favor of irrigation of $360. This is a pointer toward the solution of a problem that may be worth millions of dollars to the State of Illinois.

RELATIONS OF BARK-LICE TO HORTICULTURE.

W. G. JOHNSON, ASSISTANT STATE ENTOMOLOGIST, CHAMPAIGN.

Mr. President:

There is no group of insects which is of greater importance to horticulture to-day than that family which includes the creatures popularly known as "Coccids," "Scale-insects," "Mealy bugs," "Scale-bugs," or "Bark-lice," etc. They are to the horticulturist, in many localities, what the chinch-bug is to the agriculturist in the southern portion of this State. There is scarcely a shrub or tree but that is subject to their attacks, and in many localities extensive orchards have been ruined by them. The minute size of the creatures, the difficulty of destroying them, and their wonderful reproductive powers, all combine to make them the most formidable of the pests of our orchards and ornamental grounds. It is only necessary to cite the mealy bugs of the greenhouse, the oyster-shell bark-louse of the apple, and the various species of scale-insects destructive to citrus fruits, to establish this fact.

Notwithstanding the great importance of this subject, comparatively little thorough work has been done on the species represented in this country. This is doubtless due to the difficulties attending a careful study of even a single species of this group, and to the fact that the small size and plain appearance of the insects render them unattractive to most entomologists.

Our present knowledge of this group is largely due to the work of Prof. J. H. Comstock, formerly United States Entomologist, and now Professor of Entomology at Cornell University. He pointed out that the greater part of the injury done to orange-trees was caused by scale-insects.

Previous to 1880 only about thirty species had been described by American writers, and of this number more than one half were described by Dr. Asa Fitch, the first State Entomologist of New York. At the present time we have in North America, north of Mexico, about 125 species, about one fourth of which have been brought here, one way or another, from foreign countries, and include some of the most destructive horticultural pests with which we have to combat.

I need only relate the story of the dreaded cottony-cushion scale (*Icerya purchasi*), which swept California like an avalanche, and almost wiped the great horticultural industries from her borders. This ravenous creature was carelessly introduced into California on a consignment of citrus trees from Australia, not very many years ago. Once established it found the climate very conducive to its health, and, being a prolific breeder, soon spread far and wide throughout the State, and openly challenged the intelligence and enterprise of the most thoroughgoing horticulturists for its destruction. Hundreds of acres of orange-trees which had yielded handsome returns only a few years before, were now utterly worthless.

Everything that could be done by united and determined effort to destroy this pest proved of no avail. Orchardists appealed to the State for aid, and the State in turn to the United States Government.

It was known that this insect was not an alarming pest in its native haunts, and an expert entomologist was sent by the State and the Government to Australia to ascertain if possible what natural agency kept it in check, and this resulted in the happy discovery of the little *Vedalia cardinalis*. This beautiful little lady-bug was sent to California and established on orange-trees, which were literally covered by the cottony-cushion scale, over which enormous glass frames were built, so as to confine the treasures. It multiplied rapidly, and was distributed to orchardists throughout the length and breadth of the State. The results were marvelous, and have been fittingly summed up by Mr. Kercheval, in the following words:

"More deadly than the hordes of Goths and Huns that came to plough Rome and harrow Italy, came the countless legions of Icerya, and shriveled foliage and bare and blasted boughs everywhere told of their resistless and ruthless march. No watchfulness or vigilance could guard against their attacks or turn them from their victorious course. Then in the deep night of despair came a miracle and relief. As silent and noiseless as came the angel of death to smite the Assyrians beleaguering God's chosen people, so came the Vedalia to California's aid, and like Senacherib's countless hosts, the cottony-cushion legions almost in a night melted away and were no more. What a vast army of men and millions of dollars could not have performed in years, a mere handful of Australian lady-bugs virtually accomplished

in a few weeks, and even to us who closely attended and watched their work, it seems utterly incomprehensible and almost beyond belief."

Rid of this, "the prince of scales," horticulturists are still pleading for aid in the same regions. The red scale (*Aspidiotus aurantii*), of the orange, the pernicious or San José scale (*Aspidiotus perniciosus*), and many others, make successful orcharding a very irksome task.

It is not an uncommon occurrence to find oranges and other fruits in our local markets covered with scale-insects (see Fig. 1). Only a few days ago I found a lot of lemons from Florida covered with one of these pests (*Mytilaspis citricola*). The mer presence of these pests on fruit is ample evidence that the trees from which they came were attacked by the same insidious creatures, which sapped its life and vigor, thus depriving the fruit of the elements so requisite for its perfection. Fruits of whatever kind from scale-infested trees are always inferior in quality, stunted in growth, and, as a general rule, unfit for the market. Yet they are rubbed, scraped, and polished by the hardy old farmer who honestly thinks, I suppose, that he is restoring what insects and disease have destroyed, and takes them to market as "the best in the world." It is hard to tell who has committed the greater sin, the honest farmer who has so skillfully plated his fruits with gold, or the straightforward, upright, silver-tongued tree-agent who covered up disease and insects with the same precious metal when he sold the stock.

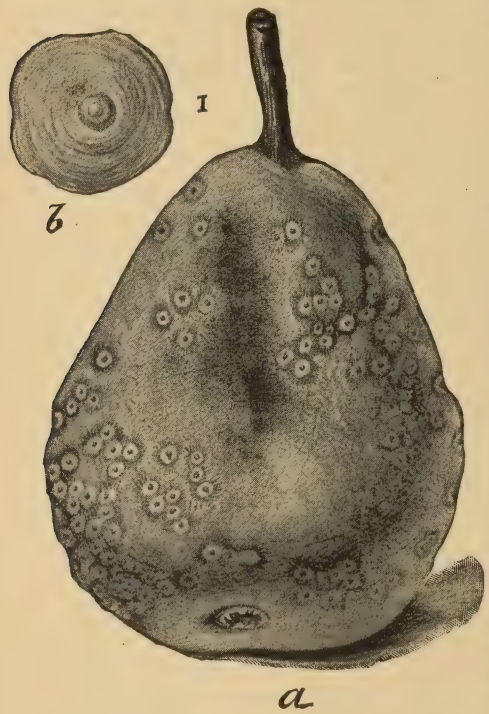


FIG. 1.—San José Scale: *a*, pear, moderately infested—natural size; *b*, female scale—enlarged.

Experience has already shown that the most formidable insect foes of the horticulturist are those he has introduced himself. Is it not high time, then, that this class of people, all over the country, should make a determined effort to keep such enemies from being introduced?

California has taken a step in advance of other States in this matter, and has by legislative action made provision for and appointed a State quarantine officer, whose duty it is to inspect all incoming trees, shrubs, or plants, from whatever source, and who is empowered with authority to condemn and cause to be destroyed all plants he may deem dangerous to the horticultural interest of that State. In accordance with this law a comparatively recent shipment of 60,000 orange-trees from the Sandwich Islands, infested by a treacherous scale-insect (*Chionaspis biclavis*), was condemned and the entire cargo destroyed.

Would it not be a good idea for horticulturists all over this State to be on their guard, and to call the assistance of the State Entomologist even on the slightest suspicion that their nursery stock is not entirely free from insect pests?

The practical value of a more thorough knowledge of these enemies has been impressed on me several times during the past summer. I have frequently come across young orchards in this State, in which both the scurfy bark-louse and the oyster-shell bark-louse had a strong foothold. On inquiry I found that in every case they had been observed by the owners, but were not regarded as harmful; in fact, were not even recognized as insect foes.

There are already within the borders of this State many ravenous scale-insects. The most common one, perhaps, is the oyster-shell bark-louse (*Mytilaspis pomorum*), shown at Fig. 2, which was introduced into

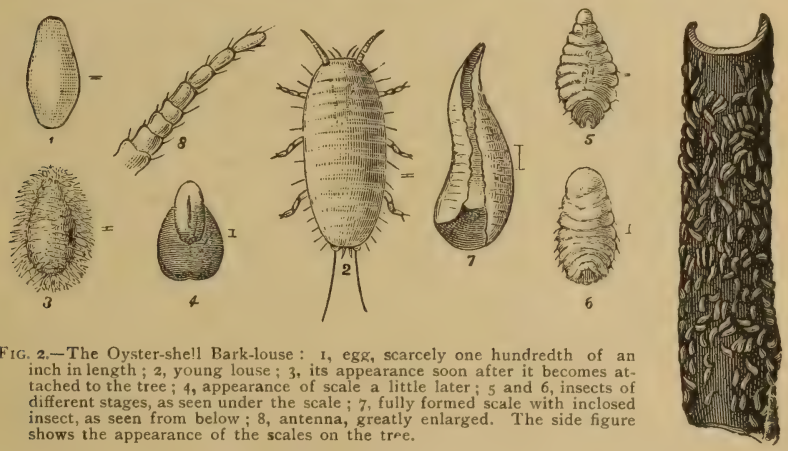


FIG. 2.—The Oyster-shell Bark-louse: 1, egg, scarcely one hundredth of an inch in length; 2, young louse; 3, its appearance soon after it becomes attached to the tree; 4, appearance of scale a little later; 5 and 6, insects of different stages, as seen under the scale; 7, fully formed scale with inclosed insect, as seen from below; 8, antenna, greatly enlarged. The side figure shows the appearance of the scales on the tree.

this country more than a hundred years ago from Europe, but did not appear in Illinois until about 1852, occupying first the districts bordering Lake Michigan, where it committed terrible ravages, and then spreading westward and southward over the entire State. This insect is

known to attack a great variety of trees, although it seems in this State to prefer the apple above all others.

The scurfy bark-louse (*Chionaspis furfuris*), shown at Fig. 3, is another very common scale on the apple. It is a native American

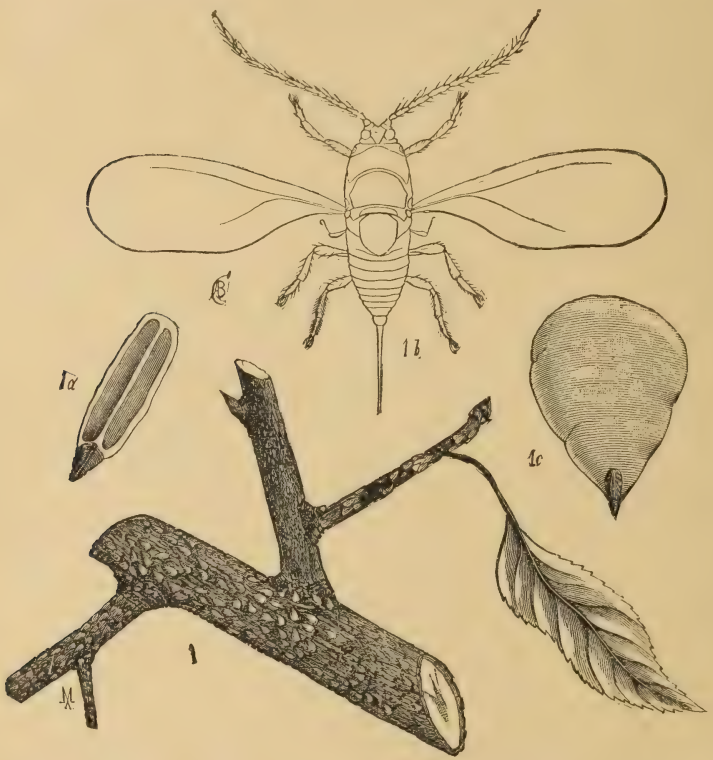


FIG. 3.—The Scurfy Bark-louse: 1, scales on twig—natural size; 1*a*, scale of male—enlarged; 1*b*. adult male—enlarged; 1*c*, scale of female—enlarged.

species and has existed from time immemorial both in the East and West, its native home having been our native crab-apple. It occurs in considerable numbers throughout the whole State, but is nowhere so destructive as the imported species. It has been found on apple, pear, cherry, and other trees in this State.

The two species are easily distinguished the one from the other, the scale of the imported species being an ash gray, reddish brown, or very dark color, conforming in most cases to the color of the tree, and of an irregular outline, very closely resembling a miniature oyster-shell, which, in fact, its name indicates. If one of these scales

be lifted up with the point of a penknife any time between the middle of September and the middle of May, a mass of very small white eggs will be seen. The native species, on the other hand, has a flat scale, somewhat irregular in outline, grayish white in color, and its eggs are purplish red.

In order to present a more comprehensive idea of these creatures, I will give briefly a hint as to their classification and a sketch of their life-history.

There is not a more anomalous group of insects in the insect world. They differ greatly, even from closely allied forms, in appearance, habits, and life-history. Not only do members of this family appear very different from other insects, but there is a wonderful variety of forms within the family, and even the two sexes of the same species in the adult state differ as much in appearance as insects of different orders.

Who, for instance, would suppose the creature represented at Fig. 4 had anything in common with the one at Fig. 5. Yet they are so closely related that the destruction of the one means the speedy extinction of the other. They represent male and female of the same species (*Diaspis lanatus*), a recently introduced destructive peach-tree scale. It will be well to keep a close watch of your peach-trees, especially if they come from the East, for this pest has made its appearance in certain portions of the Atlantic States.

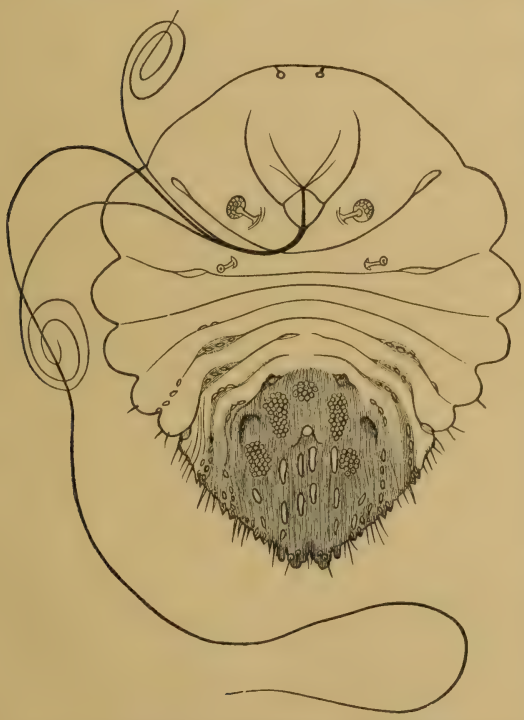


FIG. 4.—An Adult Female Scale-insect, under surface—greatly enlarged. The long, thread-like appendages are the mouth parts.

The most obvious characters in which bark-lice agree and by which they may be distinguished from other closely related insects, are the absence of wings in the females (Fig. 4), and their presence in

the adult males (Fig. 5). They possess but a single pair, however, the second pair being represented by small club-like organs, each usually furnished with a hook which fits into a pocket on the fore-wing. These organs are said to aid in flight (Fig. 5, *b*).

The adult male, although winged and furnished with well-developed legs, is harmless, its sole office being the propagation of the sp cies. It possesses no mouth, and, therefore, not having any use for a digestive tract, nature has not taken the trouble to supply one; but on the other hand she has utilized the place where the mouth ought to have been and supplied an extra pair of eyes.

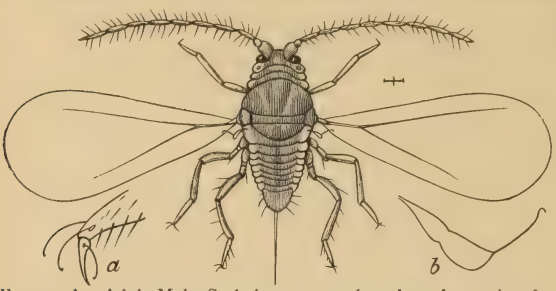


FIG. 5.—An Adult Male Scale-insect—greatly enlarged: *a*, tip of foot; *b*, club-like organ with hook, which represents the second pair of wings. The small cross-line above the right wing represents the natural size of the insect.

The adult female, however, is legless, wingless, and even eyeless; but is supplied with well-developed mouth-parts and an elaborate digestive apparatus.

The changes through which a bark-louse passes in the course of its development are very remarkable.

How many of you would associate the irregular outlines given in Fig. 6, with those in Fig. 4 and 5? Yet they all represent one

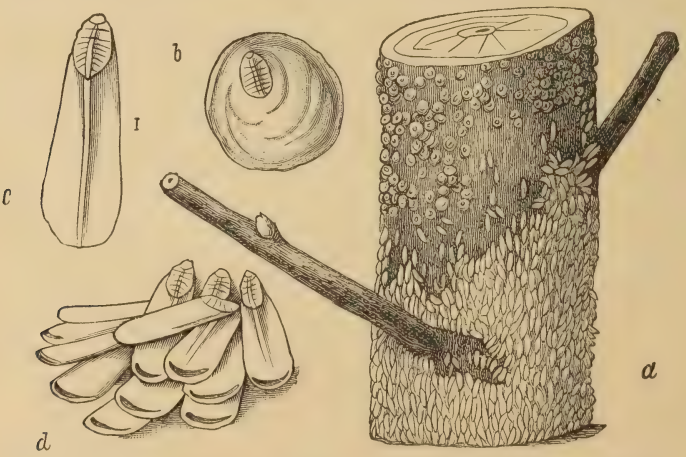


FIG. 6.—Section of a peach trunk infested with male and female scales—natural sizes: *b*, scale of adult female; *c*, scale of adult male; *d*, male scales in natural position—greatly enlarged.

species. The scale of the adult female is at *b*, and that of the adult male at *c*, Fig. 6. Many strange forms are included in this group, and even entomologists have mistaken them for very different organisms.

The newly-hatched bark-louse is oval in outline, much flattened, furnished with six legs, a pair of antennæ, and an apparatus for sucking the juices from plants. A young louse is represented at Fig. 2, 2. At this stage of their existence the young creatures, mere specks, can be seen crawling in all directions over the leaves or bark of infested trees. After wandering for a time, usually but a few hours or even less, the young bark-louse settles on some part of the plant, inserts its proboscis-like beak, and draws its nourishment from the tree. In a short time there begins to exude from the body, very fine threads of wax which are cottony in appearance. The excretion of this wax continues until the insect is completely covered by it. Sooner or later the louse begins to excrete a pellicle which is dense and firm in texture. The cottony mass disappears, and after a short time the creature sheds its skin, which with the pellicle forms a very firm scale-like covering over its body. In the case of the female, which has no further use for legs and antennæ, these organs are now shed and it remains stationary. The mouth-parts are retained, however, in a highly developed condition, and are well adapted for the performance of their functions; namely, that of pumping sap from the plant. This apparatus is not the least remarkable thing in the structure of these insects. It is terminated by a thread-like organ (see Fig. 4) which is frequently much longer than the body of the insect, and is composed of very delicate hair-like bristles, by means of which it attaches itself and feeds.

A second molt soon follows the first, and the cast skin unites with the first one and with it forms part of the scale which covers the body of the insect. The female soon becomes distended with eggs, which it deposits beneath the scale, and then dies. The male in the early part of its development is indistinguishable from the female, but later becomes very distinct, and emerges a full-fledged insect about the time the female molts the second time. * Thus the life-cycle of one of our worst enemies is completed.

I think all will agree with me, that the introduction of these pests is a serious matter and needs intelligent and serious consideration on the part of every horticulturist in the State. It is only necessary to look about you in neighboring states to see what is going on. The pernicious or San José scale (*Aspidiotus perniciosus* Comstock), see Fig. 1, the most destructive pest of deciduous fruit-trees in California, has lately made its appearance in New York, New Jersey, Pennsylvania, Missouri, Indiana, Ohio, Maryland, Florida, and Virginia. Just how this pest

* Not all bark-lice complete their life-history in this manner; but as the one cited includes nearly all those with which horticulturists in this State are liable to come in contact, I give it as a typical example.

was introduced into the East is still an unsettled question; but it probably came on nursery stock imported from the Pacific coast. The discovery, however, of so formidable an enemy in our midst has created great excitement in horticultural circles. In one instance, at least, a nursery firm has shown such a desire to make amends that it has burned up thousands of valuable trees, and has made every effort not only to repair the damage done but to prevent any similar future occurrence. A lawsuit has been instituted against a second firm, and the probabilities are that this action will accomplish what mere qualms of conscience might fail to accomplish. The result of the whole experience, it seems to me, cannot fail to make nurserymen extremely careful in the future; and care in regard to injurious insects is a point on which some of them have been greatly lacking in the past.

No farmer should set out a tree until he has examined it closely and made sure that no scale-insect infests any portion of it. He should also wash it, at least the trunk and larger branches, with strong kerosene emulsion diluted by no more than five parts of water.

What the U. S. Government can do, and what the State can do in quarantining against plant and insect pests, can only be settled by legislative action ; but what each individual horticulturist can do may be very easily settled. Every horticulturist in this State should be his own quarantine officer, and should be suspicious of every piece of nursery stock he purchases, until he is thoroughly satisfied it is free from pests.

It would be a comparatively easy matter for every purchaser of nursery stock to stipulate in his agreement, and insist on a written guarantee with each lot purchased, that the trees are to be clean and free from insect pests, that they have not at any time been affected by plant disease, nor grown in the vicinity of diseased trees. In all cases be alert, severely scrutinize every piece of nursery stock, and do not place too much confidence in the statements of tree-agents, for they are proverbially almost as sharp as lightning-rod men.

DISCUSSION.

QUESTION—How do bark-lice spread from tree to tree and from orchard to orchard?

PROF. JOHNSON—It is very curious how a species of insect which, like the female of the oyster-shell bark-louse, never acquires any wings at all, and which loses even its legs when it is only a few days old, and becomes stationary for the remaining period of its existence, can pass from tree to tree. The female is as incapable of migrating as an apple-tree, during the entire year, with the excep-

tion of three or four days in the spring. Even then the young lice move so slowly that it is altogether out of the question to consider the popular idea that they crawl over the ground from one tree to another. A few lice may pass from tree to tree if the boughs chance to interlock.

The only way in which, as a general rule, bark-lice can spread from tree to tree, is by a few of the young insects—when they are first hatched and are scattered over the limbs of a tree in prodigious numbers—crawling accidentally on the legs of some bird that chances to light upon the infested tree and afterward flies to another. That they may be carried by a moderate breeze, during their hatching period, to a distance of several rods, has been abundantly proven. In view of the inadequacy of all the theories that have been propounded, it must be admitted that the rapid and wide-spread dissemination of bark-lice is yet involved in much mystery.

QUESTION—Has the oyster-shell bark-louse any natural enemies?

PROF. JOHNSON—The agencies which have been instrumental in producing the destruction of the oyster-shell bark-louse, and which are still operating, are (1) predaceous insects, especially the lady-bugs and their young; (2) the young of the parasitic Chalcis flies, and (3) the very small creatures known as mites. Of these, perhaps the Chalcis flies are the most important. A good idea of these little creatures may be obtained from the magnified representations in Fig. 7. The amount of destruction caused by these little insects can be easily determined by either seeking out the young maggots under the scales, or by noting the little round holes through which the flies have emerged, counting them, and comparing them with the whole number of scales on a given twig.

FIG. 7.—Parasitic Chalcis of the Oyster-shell Bark-louse: *a*, fly; *b*, antenna; *c*, larva or young.

QUESTION—What are the best remedies for combating bark-lice, particularly those affecting apple-trees?

Prof. Johnson—Kerosene emulsion is a powerful insecticide, and is perhaps the best remedy for treating apple-trees affected with bark-lice. It kills by contact, instead of entering into the digestive canal and circulation as do such poisons as London purple and Paris green. Pure kerosene (common lamp oil) would be just as destructive to the trees as it is to insect life. It must, therefore, be diluted with water before using—a rather difficult matter to do, you will say; yet, by going at it in the proper manner, this can be done. The following directions, if carefully followed, will give the desired result. The formula is this:

Kerosene or coal oil..... .....2 gallons.
Water.....1 gallon.
Common washing soap..... ....½ pound.

Stir the soap in the water and add it boiling-hot to the kerosene, and churn violently for five or ten minutes by means of a force-pump or syringe. The emulsion, if perfect, forms a cream, which thickens when cool and should adhere without oiliness to the surface of glass. Dilute the emulsion with twenty-seven gallons of water before using; that is, for every gallon of emulsion add nine gallons of water.

The kerosene emulsion should be applied with a good force-pump. If the trees are small cut them back as much as possible, and scrub them thoroughly with the emulsion, using a common stiff brush. The time of application should be determined according to the species treated. For the oyster-shell bark-louse and the scurfy bark-louse, the early part of May, or just as soon as the young lice are hatched, is preferable. The wash can also be applied in the fall or winter, when the leaves are off, in which case the emulsion may be made much stronger.

COMMITTEE REPORTS.

Your committee, to whom the treasurer's report was referred, report that we have examined same and compared the items with the orders, as vouchers, and find the report correct.

W. S. PERRINE, L. R. BRYANT. } *Committee.*

Report accepted.

OBITUARY RESOLUTIONS.

WHEREAS, It has pleased the all-wise Father to remove from our midst, Elmer Baldwin, one well known for his distinguished services in Horticulture, for his love and kindliness toward all, one who had lived a long and useful life among us, who had been closely identified with the early history and management of this State, who was one of the founders, and always an active member of this society, and whose departure will be mourned by his many loving friends—therefore

Resolved, That the members of this society tender to the bereaved family its kindest sympathy and condolence, that we place upon the records this tribute to his memory, and that the secretary be directed to send the family a copy of its proceedings containing this notice.

ARTHUR BRYANT, O. W. BARNARD, LEN. SMALL. } *Committee.*

Adopted by a rising vote.

FINAL RESOLUTIONS.

Resolved, that we extend the thanks of this society to the Board of Supervisors of Lee county for the use of the Court-house. To the Hon. J. F. Palmer, mayor of the city of Dixon for his cordial welcome given the society in behalf of the city. To the various pastors of the churches of Dixon for their words of encouragement and prayers for the success of our society. To the College Orchestra, to the Young Men's Quartette and to Miss Nellie Moyer for splendid music rendered during our deliberations. To the hotels of the city for their liberality and hospitality. To the local committee of arrangements, and Mr. Hartwell in particular for his untiring energy in behalf of the same, and to all others who contributed to the success of the meeting. To the eminent horticulturists and visiting delegates from other States; Messrs. R. M. Kellogg and R. Morrill of Mich., D. A. Robinett of Missouri and W. H. Guilford of Iowa; to the Missouri State Horticultural Society for the fine collection of apples displayed here during our meeting; and to the citizens of Dix n our thanks for the uniform courtesy and kindness extended to us all during our sojourn in their beautiful city.

Be it further *Resolved*, that we regard the interests of horticulture and agriculture equal to if not paramount to all other interests and industries, and thank the legislature of our great State for former appropriations for the carrying on of experimental stations, etc., for the purpose of furthering these interests and the success of these important industries, without which all others fail.

Resolutions adopted and society adjourned.

PLANTING AND GROWING AN APPLE ORCHARD.

(The following extracts are from essays entered in competition for prizes offered by State Society Essays awarded first and second prizes will be found on pages 18 and 93 respectively.)

ELMER BALDWIN, FARM RIDGE.

* * * The tree should be prepared for setting by slightly lessening the top—not radically. I have found by experience that cutting away most of the top, as practiced in England, and largely at the east, will not do in our soil and climate. The shape and symmetry of the future tree is largely influenced by the first pruning. The aim should be to form an open head evenly balanced, and so as not to necessitate cutting large limbs afterward.

After the trees come into bearing cropping should cease, but the tillage continued as long as the trees continue. Here is the great fault with our orchard management—probably ninety of a hundred of our farmers' orchards are in a blue grass sod; about as well raise corn in such sod as apples, successfully. The growth is checked; they succumb to drouth, which prevents the healthful formation of fruit buds and deposit of material for early spring growth. They are like a calf, spring-poor in the fall, bound to make a sorry show in the spring, if alive.

From a long season of rest in the dry season, the fall rains start the circulation of the sap and the first freeze loosens the bark and destroys the tree. If they survive, the body and large limbs are covered with water sprouts, which saps what little vitality remains. Now the only practical remedy for all this is thorough and persistent cultivation; the ground should be plowed in fal or spring, and then followed with the pulverizer, drag, cultivator, or any good instrument, once or twice a month, or as often as necessary to keep the ground clean and in mellow tilth.

S. G. MINKLER, OSWEGO.

* * * Now do you expect something for nothing? You plow your ground, plant your corn, and let it be without cultivation and what will be the result? Weeds.

It is just so with the apple orchard.

There stands an apple tree. I will ask it some questions.

How long have you been here? "Forty years."

Have you borne any fruit? "Yes."

How many crops? "About thirty."

Well, what did you get for your pay? "Blue-grass."

Did you ever have a load of manure given you? "No."

Were you ever plowed around? "No."

Well, what else did you have to do? "Feed the calves; and the colts would pull the hair out of my head and bite my ribs."

Now, can you expect something for nothing? Keep out the colts and keep out the sheep, unless you are too lazy to prune the trees yourself. Also keep out the hogs and calves, and especially the blue-grass. The ground should receive thorough cultivation for at least five years, with any hoed crop as potatoes, corn, beans, etc. During that time the land should receive a top dressing of manure.

Return the soil to its original fertility so that your trees will have something to feed upon except blue-grass. I will venture to say that there is not an orchard of five acres in this town that is under thorough cultivation or has had a top dressing during its life-time but blue-grass. You have robbed the soil of its fertility, and now you have spent thousands of dollars to ransack Russia to find some hardy variety to withstand your negligence.

H. J. DUNLAP, KANKAKEE.

* * * There is little choice between fall and spring planting, and, if I had it to do, should do it at the most convenient season; the earlier in spring, the better. If planted in the fall a mound of earth should be thrown up around the body and a protection of cornstalks, lath or paper be placed around the body to keep rabbits from gnawing them. All newly planted trees should have their tops thinned out, and some advise severe cutting back, but I am not so sure that the latter is of any particular value. I would be especially careful to keep all suckers rubbed off around the branches and trunk while they are small, and also pay attention to twigs starting in wrong places, for it is easier to rub off a small shoot before the tree has wasted energy in growing a sprout than to cut it off afterward.

There can be no general rule laid down for the care and culture of an orchard; these are largely to be determined by the growth of the trees; by the fertility of the soil and the purpose for which the orchard is planted. It requires a careful study of methods, which can be best learned by visiting successful orchards in the same latitude and adopting them where practicable.

O. W. BARNARD, MANTENO.

* * * Hoed crops may be grown between the rows of trees, but not in them, with thorough cultivation during the season; but to obtain the best results, especially should the first summer be very dry, plant nothing among the trees, and give the land shallow cultivation once a week till October; the nearer like fine dust the surface is kept, the

better. This cultivation with or without hoed crops should be continued for five years, and with some varieties and soils for seven, but may be less frequent after the first year. The pruning should be done in early spring before the sap starts, and with a view to beauty and utility of form, heading the tree neither too high nor too low, and preventing the formation of acute forks, or sharp crotches of main branches; as a rule the north side will need more pruning than the south side. The pruning should not be too severe, but confined chiefly to the early years of the trees' life, solely with a view to proper form; and thus pruned and trained while young, like the well-trained child, will need but little in after years.

J. L. HARTWELL, DIXON.

* * * The planting of an apple tree is as serious a question to a household as the building of a home, and is none the less serious to one who raises apples for commercial purposes. The considerations are even more important. A house may be altered or torn down and rebuilt in a few days or months at most, while years are required to correct the errors committed by the tree planter.

The lay of the land, kind of soil and drainage are important factors to be considered. Rolling is better than flat land, and a north or west, to be preferred to a south or east slope. A clay subsoil is desirable, and good drainage, either natural or artificial, absolutely necessary.

Many varieties of apples are worthless. The planter is practically at the mercy of the dealer, as far as varieties are concerned. He who sells you a shoddy suit wrongs you no further than the price paid for the suit, but he who teaches your child bad habits, or sells you a worthless tree has damaged you almost, if not quite, beyond repair.

E. C. EARL, CENTRALIA.

* * * Diversified farming is gaining ground; and for the thoughtful, painstaking farmer, apple growing offers the safest and surest way of escaping the ruinous competition which he must meet in raising wheat, cattle and pork. The trees in a well tended orchard, containing only carefully selected varieties, are worth more at five years from planting than the land on which they grow.

Choose only those varieties which are hardy, healthy and productive; which hold their fruit until ripe, and which bear well-colored fruit of good size and quality. For a family orchard, quality of fruit is one of the first considerations. Carefully prepared lists of varieties, suitable for the northern, central and southern parts of

the State, will be found in the reports of this society. My own selection of market varieties for southern Illinois would include for early summer: Yellow Transparent and Benoni. Fall: Grimes' Golden and Jonathan. Winter: Ben Davis or Gano, Mammoth, Black Twig, and, for trial at least, Shackleford.

I would add for family use Early Harvest, Sweet Bough, Jefferis, Rome Beauty and others. Yellow Transparent I would especially recommend as a market apple for southern Illinois. Jonathan is of the best quality, but drops its fruit badly. Duchess, Wealthy, Willow Twig and Minkler are said to be excellent varieties for northern Illinois. Some of the newer varieties, which seem to have merit, are Aiken, Arkansas Beauty, Arkansas Black, Salome, Shackleford and York Imperial.

GEO. F. KNAPP, NURSERY.

* * * If the trees are in good condition (as they should be), heel them immediately; but if somewhat dry, bury them root and branch for a few days in fine, damp, mellow soil, which will restore them again to their growing condition. If procured in the fall (which is really the proper time to purchase your stock), and you do not believe in fall planting, they may be taken care of in the following way: Dig a trench one and a half to two feet in depth, and as long as the trees, slanting from the level surface of the ground to the deepest point of the trench. Place the trees therein with the roots at the deepest point, and cover them over with fine, well pulverized, clean soil, mounding them over the branches, as they will be a little above surface. Before covering, however, be sure you open bundles and spread your trees slightly, or your work will be in vain. After the ground has become slightly frozen cover them over with straw or leaves, to protect them against rapid thawing or freezing.

Do not think you can grow an orchard without cultivation unless you don't care when or how much fruit you get. No farmer should think of growing crops without cultivating them; neither can you grow an orchard successfully without cultivation. By cultivation you may realize in seven or eight years what, without cultivation, would take twice that length of time, and probably destroy your trees. Cultivation is also the surest safety against drouth.

ELI CORBIN, CARBON CLIFF.

* * * The best time to set an apple orchard is about the last of October till the middle of November, when the ground is not wet and sticky, but moist and loose enough to work well. The growing season is then over and the trees will hardly be affected at all by the change

from nursery to orchard. The roots that have been cut in digging and preparing for re-setting will callous over and the ground will settle firmly about the roots and in the spring the tree is ready to waken into new life without a check to its growth. Good, thrifty one-year-old trees are the best, because the most sure to live, are quicker set, they get damaged less if shipped from a distant nursery, are cheaper, we get more fibrous roots with them and it is not necessary to cut the top back, but can let it grow straight up, forming a beautiful top without the numerous forks so objectionable to trees that have been headed back, as we have to do with three-year-old trees to make the top correspond with the roots that have been cut off. At the end of five years we will have a better orchard than if large trees had been used.

CHAS. H. SUMNER, STERLING.

* * * It seems reasonable to suppose that the whole root of the seedling would form a better stock for the grafted scion than the piece roots, *i. e.*, than the same seedling divided into a number of pieces. At least, so long as it is not disputed that whole trees are as good as piece-rooted ones I would give the benefit of the doubt to the whole roots, because we are more apt to find truth among the progressive few than the conservative many.

If, in addition to having whole roots, the tree has been top-grafted on a hardy sort like Duchess it seems it should add to the hardiness of the tree. At least the testimony is overwhelmingly in favor of the top-grafted, double-worked trees.

Moving the trees from the nursery to the orchard ground should be done in the late autumn after the leaves have fallen off. Be sure that the roots are not unnecessarily damaged in the digging. Root-pruned trees are the best, and, after taking up, see that the roots are not in the least exposed to drying in the air, wind and sun. Bury them in a well drained spot on the farm or orchard ground. Cover them all up in the ground, top and all, so that the moist earth completely surrounds every root and top, in order that dryness, mice or frost may not injure them. Plant the tree an inch or two deeper than it grew, this depth depending on the dryness of the ground. Place the earth carefully and firmly about each root. I have had the best of success by planting one-year-old trees behind a spade without digging a hole. The orchard trees ought to be set two rods apart each way; twenty-five feet may do for small growing varieties. Close planting is to be deprecated. I have seen large trees that were close enough at forty feet apart each way. The sun should shine on the ground freely between the trees.

NATHAN WESTON, CHAMPAIGN.

* * * In conclusion, I desire to emphasize the importance of the conditions of moisture in growing an apple orchard. Such has been the central thought of this essay. It has been very commonly maintained that the failure of the apple crop from year to year is due to hard winters, cold winds and sudden changes in temperature. It is firmly believed that these things have not the vast importance that has been ordinarily attributed to them. They have often been set forth as reasons why there were no apples, while the fact has been that there was a lack of moisture during the time when the trees were growing and forming fruit buds. It is a notable fact that when the conditions of moisture have been favorable there have been abundant crops of apples almost regardless of all other conditions. This point is unquestionably one worthy of great consideration by the practical fruit grower.

A. W. ORR, OTTAWA.

* * * If you have plenty of land to spare plant your trees at least twenty-four feet each way and about two or three inches deeper than they were grown in the nursery row, and at times when you see an open space around your tree, caused by the wind moving the tree, keep that filled up and well packed. This should always be looked into before winter sets in. Sometimes there is a space from one-half to two inches thus left; the rain and snow fill this space and freezing there always hurts the trees more or less. I think more young trees die this way than any other, and I believe that this is the cause of blight to a certain extent.

F. L. WILLIAMS, TAMAROA.

* * * Set tree same depth it grew in nursery. Be careful or you will get it too deep. If ground is very flat allowance should be made for ridging the row sufficient to give surface drainage. See that every root is in natural position, with mellow earth worked well among them, with the hands if necessary. Tramp firm when roots are covered and finish with loose soil not firmed. Leave level. Don't mound around tree. It sheds water too much. The lowest or heaviest branch should be turned to the southwest.

Fall planting is perhaps best if the soil is sufficiently moist and the work is thoroughly done; otherwise there is danger of winter killing. Spring planting should be done as early as possible, but must not be done when soil is wet. If trees are dug early and heeled in they may be planted quite late with fair success.

D. J. PIPER, FORRESTON.

*** For northern Illinois you should be very particular to have selected the hardy varieties, or those that have been worked on hardy stocks at least three or four feet above ground. In taking up your trees mark them so as to set the same side to the south when planting that faced the south before digging them. When you have set your young apple trees, which should not be more than three years old, plant some hoed crop in the orchard, such as potatoes, the first season and cultivate often. If the season is damp run the cultivator pretty deep; if it should be dry three inches will be deep enough to run your cultivator. Stir the soil at least every two weeks. After your trees have been set one season watch every tree and do not allow them to grow forks. Cut off all forks wherever you see them try to form. If any of the branches are inclined to grow too fast you must cut them back, and whenever you notice one side of the tree inclined to grow too fast and is likely to get out of balance cut it back to suit the head of the tree. Always aim to keep a spiral stem and have the branches start out horizontal.

MEETINGS OF THE EXECUTIVE BOARD.

FEBRUARY MEETING.

The Executive Board met in the office of the Board, at the State house, Springfield, Illinois, February 7, 1894. The following members were present: H. Augustine, president; H. M. Dunlap, secretary; and Messrs. Bryant, Fry, Johnson, Winn and Webster. Mr. Johnson moved that there be a committee of two appointed, of which the secretary shall be chairman, for the purpose of fitting up the office with library cases and other necessary fixtures, which motion carried. The Chair appointed Mr. Johnson as the second member of the committee. On motion an auditing committee consisting of Messrs. Fry and Johnson was appointed.

Mr. Dunlap offered the following resolution:

WHEREAS, There are now on hand duplicate, or extra numbers of the back volumes of the society, and whereas, these books should be placed where they would be of value, therefore,

Resolved, That five copies of each volume be reserved and placed in the library of the society; that all additional volumes be distributed to life members in the order of their membership, and be it further,

Resolved, That 200 copies of future volumes be set aside to be given to those who may hereafter become life members.

On motion the resolution was adopted.

Mr. Dunlap offered the following preamble and resolution, which were adopted:

WHEREAS, The present requirement for life membership in this society is $20 and as we believe the amount to be too high, therefore,

Resolved, That we recommend to the society a reduction in the life membership fee of $10.

On motion of Mr. Fry, the following was adopted:

Resolved, that the sum of $200 be and is hereby appropriated to defray the program expenses of the December meeting: *Provided*, however, that where persons are directly interested in the society, that railroad fare only shall be paid.

In regard to the *ad interim* work, Mr. Bryant moved that the work be left in the hands of the committee as heretofore and that $50 be appropriated to the use of each district committee, and $50 to the general committee consisting of the president and secretary, which motion carried.

On motion of Mr. Fry it was ordered that the secretary be allowed as heretofore, the sum of $50 for office rent, fuel, lights, etc., and $50 for extra office help.

Mr. Fry moved, and it was adopted, that the sum of $300 be set aside for a fruit exhibit at the annual meeting of the society, and a committee of three appointed, one from each district, to arrange a premium list, and for special premiums. The president appointed as such committee, Mr. Bryant, the secretary and Mr. Fry.

Mr. Bryant made a verbal report on the experiment stations in the Northern Illinois district, and was requested to write the same out and file it with the secretary.

Mr. Riehl made a written report on each of the stations in the Southern Illinois district, which was placed on file.

Mr. McCluer made a written report on the experiment stations in the Central Illinois districts which was received and placed on file.

Mr. Fry nominated H. M. Dunlap as the representative of the Horticultural Society on the Board of Direction of the State Experiment Station at Champaign, but owing to press of business Mr. Dunlap declined and nominated for the position Mr. E. A. Riehl, of Alton, and Mr. Riehl was elected.

Mr. Fry offered the following resolution on experiment stations which was adopted:

WHEREAS, in view of the reports made by the committee on the condition of stations Nos. 5, 12, 6 and 7.

Resolved, that no further trees and plants be sent to these stations, but that an effort be made by this board to get the benefit of such experiments as are of practical importance from the plantings already made.

On motion, the directors of the experiment stations were requested to have more thorough work done in the experiment stations, if possible, and to prepare suitable records and rules for the same.

On motion of Mr. Dunlap the committee now in charge of the experiment stations, consisting of Messrs. Bryant, McCluer and Riehl, were continued for another year.

On motion the directors were instructed to confer and agree upon the stock to be placed in the experiment stations, and for the general conduct of the stations, but that each director may after the regular meeting of the committee, purchase stock without action of the whole committee, provided notice of said purchase is sent to the other two directors, together with a list of varieties purchased, and further provided that the amount of such purchases shall not exceed the sum of $25 in any one year.

Mr. Fry from the auditing committee reported that the committee had satisfied itself of the sufficiency of the bond of Mr. Bryant, the treasurer for $10,000, and the Board on motion adopted the report and approved the bond.

Mr. Dunlap moved that the appointment of State Horticulturist as recommended by Mr. Riehl be deferred for the present and that the duty of investigating new and desirable fruits be referred to the *ad interim* committee with instructions to do thorough work in the direction indicated during the present year.

Mr. Bryant reported on the bill of Mrs. Hammond for office rent and assistant's salary. The committee recommended that $25 be allowed for assistant's salary and $35 for office rent, which on motion was adopted. A number of bills were audited and ordered paid.

The Board then adjourned to meet at the call of the president.

SEPTEMBER MEETING.

A meeting of the Board, called by the president, was held in the office of the Board, State house, Springfield, Monday, Sept. 24 and 25, 1894. Members present were President Augustine and Messrs. Bryant, Cotta, Johnson, Winn, Webster, Fry and Dunlap. Minutes of the previous meeting were read and approved.

On motion of Mr. Johnson the secretary was instructed to prepare and send out a circular in regard to life membership and the return of old volumes of the transactions in accordance with resolutions adopted by this Board.

A claim of Mrs. A. C. Hammond, for balance due her for rent of room was presented, amounting to $15.00, and after discussion a motion was made by Mr. Johnson, and adopted, to allow the claim if accepted as a final settlement by Mrs. Hammond.

Mr. Bryant moved that Mr. Dunlap of Station No. 4 be authorized to experiment with tobacco stems as a fertilizer for fruit trees to an amount not exceeding $25.00. Carried.

Mr. Johnson moved that a committee consisting of the president and secretary be appointed to ascertain the cost of publishing the next volume of transactions by writing for bids to publishers. Mr. Cotta moved to amend by adding Mr. Bryant to the committee, and that the committee be authorized to enter into a contract for the publication of said volume. The amendment was accepted and the motion, as amended, was adopted.

Mr. Fry moved that we send a delegate to each of the following State Horticultural meetings, viz.: Iowa, Wisconsin, Missouri and Indiana, and that said societies be requested to send delegates to our State meeting. Carried.

The matter of program for winter meeting was then taken up and discussed at length.

Mr. Fry moved that prizes be offered for essays written upon a given subject, and that the essays on which prizes are awarded be read and discussed at the winter meeting of the society. Carried. On motion of Mr. Webster it was ordered that the prize for best essay shall be a life membership in the society, and the second best shall receive a cash prize of $5.00. On motion of Mr. Fry the topic selected for the essays is "The Best Method of Planting and

Growing an Apple Orchard in Illinois." Essays to be limited to not exceeding 2,000 words. wards to be made on conditions agreed upon by a committee to be appointed by the Chair. All of which was adopted by the Board.

Considerable further discussion of the program was indulged in, but no official action was taken and the understanding prevailed that each member of the Board should send in to the secretary a list of topics and names of essayists, and that the arrangement of the program be left with the secretary.

The secretary reported that all surplus volumes had been stored in a room in the basement of State house, said room having been assigned by the Secretary of State, and the Board proceeded to inspect same. On motion the Board adjourned to meet at the call of the president.

DECEMBER MEETING.

The Executive Board met in room 41 of the Nachusa house, at 8:30 P. M., Dixon, Ill., Dec. 10, 1894. Present: H. Augustine, R. T. Fry, J. V. Cotta and Arthur Bryant. The secretary, H. M. Dunlap, not being present, on motion of Mr. Fry, H. J. Dunlap was elected secretary *pro tem.*

REPORT OF COMMITTEE ON PRINTING VOLUME 28.

The committee appointed by the Board at the September meeting met at the Tremont house, in the city of Chicago, Wednesday, Nov. 7, 1894, at 7 o'clock P. M. Present all the members of the committee. The secretary reported that he had corresponded with four printing establishments and had received bids from three, the other declining to make any bid for the work. The bids submitted are on 5,000 copies of the transactions of 400 pages.

The Pantagraph Printing Co., Bloomington, .$1,445.39
J. W. Franks & Son Printing Co., Peoria.... 1,293.75.
The Blakely Printing Co., Chicago..... 1,285.00.

The bid of the Blakely Co. being the lowest the contract was awarded to them. The secretary was instructed to close the contract.

H. Augustine,
A. Bryant, } *Committee.*
H. M. Dunlap.

December 11th—Present, H. Augustine, A. Bryant, R. T. Fry, C. G. Winn and H. J. Dunlap, secretary *pro tem.*

On motion of Mr. Fry, Dr. A. L. Small of Kankakee was made delegate to attend the American Pomological Society, at Sacramento, Cal., January 9-11, 1895.

Len Small, G. J. Foster and W. S. Perrine were appointed a committee to award premiums on apples.

On motion of Mr. Bryant the appointing of a delegate to the Michigan State Society was referred to the president and secretary.

On motion the secretary was directed to issue orders for premiums awarded on the order of the awarding committees.

JANUARY MEETING, 1895.

Meeting of the Executive Board in Springfield, January 14 and 15, 1895. The Board convened according to law at its room in the State house at 9 a. m., Tuesday, January 14th. President Goodrich in the chair. Members present: Goodrich, Fry, Bryant, Dunlap, Augustine and Webster.

The chair appointed a finance committee, and all bills were referred to them for investigation and report. Messrs. Fry and Bryant were named as such committee.

The secretary reported that he had secured plates of the Lincoln and Sudduth pear trees, and recommended that they be inserted in the report for 1894, as interesting and valuable historical data as to pear growing in Illinois. Mr. Fry moved that the recommendation of the secretary be approved and that the plates be inserted as recommended. The motion was adopted.

On the matter of the distribution of volume 28, the following list was agreed upon, viz.:

Northern society, 100 copies.
Central society, 100 copies.
Southern society, 300 copies.
State society, 300 copies.
State Board of Agriculture, 200 copies.
Superintendents of Experimental Stations, 120 copies.
Legislature, 500 copies.
Members of Executive Board, 200 copies.

County societies, each, 50 copies.
Farmers' institutes, each, 50 copies.
Newspapers, 250 copies.
Exchanges with other States, 150 copies.
Public libraries, etc., 100 copies.
State officers, 100 copies.
Reserve for new members, 500 copies.

On motion the further distribution was left in the hands of the secretary.

The committee of control of the horticultural experiment stations being ready to report, were called upon and their reports in writing were read and placed on file. Mr. Bryant reporting the condition of the stations in the northern, Mr. McCluer those of the southern, and E. A. Riehl those of the central districts. The reports were fully discussed by the members of the Board and it was decided to try and bring up the condition of the stations to a higher level, some of them having been adversely reported upon by the committee. On motion of the secretary the present members of the Committee of Directors of stations were reappointed for the ensuing year.

The committee appointed to investigate the bond of the treasurer elect, Arthur Bryant, reported recommending approval of same, and on motion it was approved.

Arthur Bryant was appointed delegate to the Wisconsin State Horticultural Society.

Mr. Riehl was recommended to the Board of Trustees of the University of Illinois as the representative of the State Horticultural Society on the Board of Direction of the State Experiment Station at Champaign.

The Committee of Direction reported that they would recommend that the rental of ground in the experiment stations of the society be fixed at the uniform price of $5.00 per acre annually. They further recommended that for services rendered in keeping records, making reports to the directors when requested, and in supervising work in the station, that they be paid as follows, viz.:

Station 1,	Princton, A. Bryant, Supt.....	$40 00
" 2,	Nursery, J. V. Cotta, Supt.....	40 00
" 9,	Cobden, T. E. Goodrich, Supt..	40 00
" 4,	Savoy, H. M. Dunlap, Supt....	30 00
" 8,	Alton, J. S. Browne, Supt.....	30 00
" 11,	Olney, W. C. Mace, Supt.....	30 00
" 5,	Warsaw, M. S. Hammond, Supt.	20 00
" 7,	Centralia, J. Webster, Supt....	20 00
" 3,	Marengo, J. W. Prescott, Supt.	20 00
" 12,	Lacon, G. W. E. Cook, Supt...	20 00
" 10,	Odin, J. G. Vaughan, Supt ..	10 00

On motion the report of the committee was accepted and adopted.

On motion of Mr. Fry, C. E. Mace was allowed the sum of $25 for station supervision for the year 1894.

On motion of Mr. Augustine, H. J. Dunlap was allowed the sum of $25 for services as assistant secretary at the Dixon meeting.

The secretary offered the following resolution, and the same was, on motion, adopted:

Resolved, That for the purpose of advancing the horticultural interests and that of furnishing competent speakers, that the Board through its secretary agrees to name speakers on horticultural topics at county farmers' institutes when requested so to do by the committees having in charge said institutes.

The secretary, H. M. Dunlap, reported receipts of his office as follows:

From December 15, 1893, to January 14, 1895, 70 annual membership fees.....	$70 00
January, 1894, received of S. Edwards, am't refunded by him.	21 00
Total receipts to date.....	$91 00

This amount the secretary turned over to the treasurer and took his receipt therefor.

On motion of Mr. Augustine the sum of $50, or so much thereof as is necessary, was appropriated for the purchase of standard works on Horticulture for the library, and the president and secretary were appointed as a committee to purchase said books.

Mr. Webster moved that $50 be appropriated to each of the district societies. On motion action was postponed.

The Board made the following order for station until further notice:

No. 1, Princeton, A. Bryant, Supt. All kinds of fruits.
" 2, Nursery, J. V. Cotta, Supt. Orchard fruits.
" 3, Marengo, T. W. Prescott, Supt. No new plants or trees to be sent.
" 4, Savoy, H. M. Dunlap, Supt. All kinds of fruits except strawberries.
No. 5, Warsaw, M. S. Hammond, Supt. No new fruits to be sent.
No. 6, Gilman, F. I. Mann, Supt. Abandoned altogether.
" 7, Centralia, J. Webster, Supt. No new trees or plants to be sent.
No. 8, Alton, J. S. Browne, Supt. No new trees or plants to be sent.
No. 9, Cobden, T. E. Goodrich, Supt. All kinds of fruits.
" 10, Odin, J. G. Vaughan, Supt. No new trees to be sent.
" 11, Olney, C. E. Mace, Supt. Orchard fruits only.
" 12, Lacon, G. W. E. Cook, Supt. No new trees or plants to be sent.

The secretary was instructed to publish list.

On motion the Board adjourned to meet at the call of the president.

THE LINCOLN PEAR—A STATEMENT.

In the year 1836 my mother moved from Urbana, Ohio, to Logan county, Ill., onto a farm about seven miles west of Lincoln, and brought with her the seeds from a pear which she planted in 1837, from which there grew three trees, one of which proved to be a very desirable fruit and has since been named the Lincoln pear. We always regarded it a superior quality of fruit and the tree unusually hardy and a good bearer. I know of no pear that I consider quite so valuable. The farm on which the tree stands is now owned by my brother-in-law, Mr. John Wigginton, and the tree is still well preserved and seems to be just in its prime. My husband, Calvin Grapes, propagated quite a number of trees from this Lincoln tree for his own planting near Gibson, Ill., and in Normal, Ill. The pear is fine flavored, fine grained and regarded as a delicious pear as a dessert fruit and also for canning and preserving. The tree is a vigorous grower and free from blight; so are also the young trees propagated by my husband.

Mrs. Calvin Grapes.

REPORT OF DELEGATE TO MICHIGAN.

H. AUGUSTINE, NORMAL.

Mr. President:

Your delegate to the Michigan State Horticultural meeting reports that after a notice of only a few hours he took the train for Lowell, Mich., via Chicago, December 26, 1894, in the morning, and arrived at Lowell in the forenoon of December 27th, where he found a large number of the Michigan horticulturists in session. Here we had the pleasure of greeting quite a number of old familiar faces, principal among whom were Hon. T. T. Lyon, the president for so many years; Prof. Tracy of Detroit; R. M. Kellogg of Ionia; Charles Garfield of Grand Rapids, and their very efficient president, R. Morrill of Benton Harbor, who is a convention within himself.

Mr. M. B. Williams of Kalamazoo, in talking on irrigation for Michigan orchards, impressed his hearers that much of the failure in apple growing was from lack of moisture in the soil. R. C. Kedgie of the Agricultural College, in talking on manures, showed conclusively that the great mass of horticulturists do not appreciate the value of manures in fruit growing. President Morrill laid great stress on the value of wood ashes and bonedust in peach culture. Mr. W. K. Munson also regarded the ashes and bonedust valuable in grape growing. President Morrill buys these ashes in great quantities, a large number of carloads each year. Doubtful whether wood ashes would be of value to fruit growers in Illinois.

We were surprised that the State that has a world-wide reputation for growing fine apples and in great quantities has almost abandoned the business. We found that there are very few orchards being planted and many of the old ones are being destroyed to make place for the peach growing industry which is being carried on to an almost incredible extent. Our friend, President Morrill, was arranging at this meeting to put out in addition to his already very extensive orchard an additional plant of 1,800 acres. And from what we could gather while the peach question was being discussed, we are not at all surprised at this for the reports of profits in peach culture was simply beyond anything we ever heard tell of. The report from different parts of the State shows a good crop is the rule and the failure the exception. Another matter that impressed your delegate in the report on peach culture was that very few of the varieties that we grow in Illinois are planted by our Michigan friends, but their plants are largely of their own seedlings with local names. Apple crop in 1894 very poor. Small fruit crop light, except strawberries, a very good crop.

R. M. Kellogg gave an excellent paper on strawberry culture, giving new method of planting and cultivating, for which he has invented some excellent implements, especially the implement used in planting the strawberry.

The Michigan fruit-growers are enthusiastic believers in spraying to prevent disease as well as against insects, and seem to think they have the best spraying machine in the "Eclipse," manufactured by Morrill & Morley of Benton Harbor.

Much more might be said about the interesting discussions, but we will refer you to the volume of the Michigan transactions which will soon be issued by the very efficient and wide-awake secretary, Edward C. Reid of Allegan, Mich. Suffice it to say that with the exception of the fact that our old friend Garfield abused our much admired and highly prized Ben Davis apple, and thought we Illinoisans ought to be prosecuted for planting orchards of it—with the exception your delegate was treated so royally that he felt a regret when the time for adjournment came.

REPORT OF DELEGATE TO IOWA.

JAMES T. JOHNSON, WARSAW, ILL.

The spacious and well-lighted Cycling Club Hall in the city of Des Moines was, on the occasion of the annual session of the Iowa society, December 11, 12, 13, filled with a large audience and a grand fruit exhibit. We were not prepared for the great surprise in the way of fruits which were spread out at Des Moines.

As we entered the large room and looked to the right we beheld over two hundred feet of tables, six feet in width, covered with Iowa fruits. Over seventy-five per cent of the specimens were perfect, and several well known varieties of apples shown were larger, finer and better developed than I have ever seen produced—indeed, giving evidence that there are some elements in the soil of southwestern Iowa producing (in some cases) specimens three times their usual size; and this leads us to the reflection that ere long, if we weary not in well doing, we shall all learn just what peculiarities are common to each variety of fruits we desire to grow, as well as the elements contained in our soils and thereafter cease to waste our time and money on things untested locally.

The membership of the State society, itself large, being from two hundred and fifty to three hundred members, and nearly one hundred being life members, adding to this an interested and intelligent local attendance, and we need hardly say the meeting was interesting and profitable or that a vast amount of valuable facts were brought out in the topics discussed.

In discussing stone fruits we noticed the Russian plums were all condemned, while the outlook for native varieties was bright in Iowa. The Prunus americana plums were recommended for drying and also for their long season of ripening.

Mr. Bombarger would grow grapes only for home markets and for wine, as our western grown grapes are sure to be too thin skinned for shipping. This was claimed to be the result of our drouths and heat.

A box or package of grapes is much improved in appearance by packing stems all downward, and grapes and berries should never be picked when damp.

In the discussions on raspberries the Older (black) and the Turner (red) were the favorites. The Older, it was claimed, stood drouth best of all.

Speaking of drouth, the paper by W. H. Hoopes, of Muscatine, who is recognized as a successful and enterprising grower of vegetable products, entitled, "No More Uncertainty in the Vegetable Garden," was listened to with wrapped attention. No more uncertainty meant irrigation, and it may be of interest to know how Mr. Hoopes did it. At the time of the speaker's inspiration it had become evident that 1894 would witness another loss of the vegetable crop from drouth, and that, too, in the face of the fact that God in his goodness has placed at our hands thousands of water-sparkling lakes, splendid rivers, innumerable rippling brooks, springs and water levels. Why should we fail? Possibly because of the bounties which supply our wants. If we utilize these bounties we cannot fail. In this mood the matter was talked up, and soon no less than eighteen irrigation plants were in successful operation in the vicinity, and with results that far exceeded the most sanguine expectations. Potatoes that under the most thorough and skillful culture (without irrigation) yielded only forty to sixty bushels of poor and flavorless tubers were increased by irrigation to 240 and 260 bushels of tubers of the very best quality.

HOW IT WAS DONE.

At Muscatine they used the drive well system—this is not practical everywhere, but is in many places—driving the wells fifteen to twenty feet deep on the highest land so as to flow the water readily. Either a windmill or a ten-horse power engine may be used for pumping, running three pumps at each setting. A head-open ditch conveyed the water to the furrows and large fields are thus soon watered. Three to five acres are thoroughly wetted in one day. The writer thus irrigated forty acres, increasing his yield from 5,000 to 8,000 bushels. Everything included a delay of less than two weeks' work. He watered twice only in this season of drouth, and it is seldom that more than one watering is needed.

Think of it, crops increased fully three fold for these few days' work, and product all salable food, bringing much higher prices on

account of superiority; thus making a business once overshadowed with doubts as to results hereafter one of comparative certainty, pleasure and profit. The essayist computes the annual expense of his irrigation at $1.50 per acre.

The question of local cold storage was well handled. The conclusions arrived at were that chemical cold storage was neither necessary nor practical in remote localities, and that ice properly arranged with air chambers was a complete success.

The State experiment stations met with some sharp criticisms. "After nearly two decades the people are anxious to know what degree, if any, of success has been obtained."

"No good has come of the Russians, neither can there be. Moving varieties southward is contrary to nature, as we get fall apples where winter is desired."

"Japan fruits promise better than Russians."

"European grapes do no good in America."

"Our valuable results are all from native varieties."

"Four-fifths of the money expended is only wasted."

"We need complete reorganization from top to bottom. One good station is worth more than all we now have.'

Prof. N. E. Hansen, Ames, Iowa, in his lecture on European Horticulture, called especial attention to a novelty in apple production, the "Bismarck" always bearing at one year old.

Mr. Bombarger gave us a new departure in top grafting, "preferring June as the time to graft."

Mr. Berryhill's paper on "Forestry and Forestry Legislation" was listened to with marked attention. The speaker took the view that this problem could not be solved on State lines alone. The State can do much, indeed the individual can do much, but to fully meet the case and solve it in the interest of the entire people national action is needed. The arid regions west should be restored to the government for a timber belt, and if such large areas were grown in timber and preserved inviolate our next generation would never see such condition of drought as we experienced in 1894.

"The Modification of Plants by Man" was handled in a masterly manner by Geo. W. Carver, of Ames, showing some of the wonders realized through systematic cultivation and hybridization.

Many other subjects were brought up, some incidentally, but all were treated in the same clever and helpful manner.

The meeting as a whole was gratifying and valuable, and it was a real pleasure to know that our neighbors are producing some of the finest and most luscious of fruits and that they are indeed leaders and not followers in the horticultural world.

We acknowledge the most courteous attentions of our Iowa friends and we appreciate highly their generosity and hospitality.

THE ORIGINAL SUDDUTH PEAR TREE, NEAR SPRINGFIELD, ILL.
10½ feet in circumference, 55 feet high, 75 years old.

[See Page 145.]

TRANSACTIONS

OF THE

TWENTY-FIRST ANNUAL MEETING

AND

FIFTH OF THE RE-ORGANIZATION

OF THE

HORTICULTURAL SOCIETY

OF

SOUTHERN ILLINOIS.

Held in Mt. Vernon, November 21, 22, 23, 1894.

REPORTED BY

E. G. MENDENHALL, Secretary, Kinmundy.

OFFICERS FOR 1895.

PRESIDENT.....R. T. FRY, Olney.
FIRST VICE-PRESIDENT.....J. WEBSTER, Centralia.
SECOND VICE-PRESIDENT....J. W. FULLER, Anna.
THIRD VICE-PRESIDENT.....L. N. BEAL, Mt. Vernon.
SECRETARY AND TREASURER.E. G. MENDENHALL, Kinmundy.

Place next Annual Meeting, ANNA; Time, November, 1895.

LIST OF MEMBERS

Anderson, F. T. ..... Anna
Anderson, W. W. ..... Mt. Vernon
Angle, J. M. ..... Mt. Vernon
Buechly, E. M. ..... Greenville, O.
Beal, L. N. ..... Mt. Vernon
Boyd, C. T. ..... Anna
Barter, Wm. ..... Attila
Barter, James ..... Crab Orchard
Bond, Luther M. ..... Mt. Vernon
Black, C. W. ..... Piasa
Beach, C. M. ..... Patoka
Caspar, Lincoln ..... Anna
Cooper, C. P. ..... Richview
Casey, T. A. ..... Idlewood
Cox, John G. ..... Odessa, Mo.
Caspar, W. J. ..... New Burnside
Cunningham, T. H. ..... Centralia
Casey, Sam'l. ..... Mt. Vernon
Crain, W. R. ..... Villa Ridge
Dintleman, L. F. ..... Belleville
Eastman, H. T. ..... Anna
Ellis, Calvin. ..... Anna
Eaglin, F. N. ..... Opdyke
Endicott, Geo. W. ..... Villa Ridge
Fry, R. T. ..... Olney
French, Prof. G. H. ..... Carbondale
Fuller, J. W. ..... Anna
Free, T. H. C. ..... Dix
Flanagan, E. T. ..... Belleville
Gould, Geo. ..... Villa Ridge
Goodrich, T. E. ..... Cobden
Gaston, A. H. ..... Harvey
Germain, Hyacinth. ..... Belleville
Hollard, E. ..... Alton
Holtsclaw, T. J. ..... Mt. Vernon
Hess, L. J. ..... Anna
Hertel, Chas. ..... Freeburg
Hileman, J. L. ..... Anna
Helms, F. ..... Belleville
Hudson, Thomas. ..... Mt. Vernon
Hileman, H. J ..... Anna
Hartman, C. F. ..... Nashville
Hill, J. B. ..... Charleston
Hershey, D. ..... Mt. Vernon
Hehner, Philip D. ..... Mascoutah
Hartley, A. W. ..... Walnut Hill
Jennett, E. R. ..... Anna
Johnston, Abe. C. ..... Mt. Vernon
Kirtland, D. P. ..... Oblong
Kruse, H. J. ..... Farina

Kreutzinger, Wm.....Anna
Knowlton, H. M.....Richview
Kurth, Henry.....Centralia
Limbert, John.....Villa Ridge
Mendenhall. E. G.....Kinmundy
Mitchell, J. H.....Anna
Maxey, J. V.....Mt. Vernon
Miller, Caleb.....Anna
Miller, J. B.....Anna
Maxey, S. T.....Mt. Vernon
Moss, T. C.....Mt. Vernon
Moss, A. J.....Mt. Vernon
Murphy, F. G.....York
Martin, H. S.....Marion, Kan.
Martin, Carson.....Brownsville, White Co.
Marshall, T. S.....Salem
Mathews, J. B.....Marissa
Michels, L. A.....Flora
Nelson, Wm. K.....Marissa
Otwell, W. B.....Carlinville
Owen, Chas. F.....Fairfield
Oppenlander, C. W.....Richview
Palmer, B. F.....Mt. Vernon
Perrine, W. S.....Centralia
Plott, H. M.....Anna
Pomeroy, F. E.....Carmi
Pettit, J N.....Mt. Vernon
Phillips, Dr. L. F.....Nashville
Quayle, Thos. H.....Patoka
Riehl, E. A.....Alton
Reynolds, A. V.....Mt. Vernon
Root, F. E.....Centralia
Rider, Miss Dora.....Flora
Simpson, O. B.....Fairfield
Stokes, T. G.....Anna
Stanton, J. W.....Richview
Spangler, Louis.....Ashley
Smith, R.....Flora
Smith, J. W.....Cutler
Thomas, J. D.....Altamont
Tuck, N. J.....Carmi
Truesdale, R. B.....Effingham
Thacker, F. B.....Vienna
Vaughan, J. G.....Odin
Wallace, J. T.....Neoga
Webster, J.....Centralia
Warfield, B. C.....Sandoval
Williams, F. L.....Tamaroa
Webster, C. H.....Centralia
Ward, J. W.....Mt. Vernon
Youngs, D.....Carmi

PROCEEDINGS

OF THE

HORTICULTURAL SOCIETY

OF SOUTHERN ILLINOIS

Reported by E. G. MENDENHALL, Secretary.

The twenty-first annual meeting of the Horticultural Society of Southern Illinois, convened in Protection Hall, in the city of Mt. Vernon, November 21, 22 and 23, 1894.

President Fry called the meeting to order at 1:30 P. M.

ADDRESS OF WELCOME.

BY MAYOR A. F. TAYLOR.

Mr. President and Gentlemen of the So. Ill., Horticultural Society:

I am not here to-day to use empty compliments, but to give you a cordial and hearty welcome to our city, not solely for the honor that you confer on us by your coming, but in the discussion of the various topics that may come before your convention. While imparting knowledge to each other, you may allow some crumbs of instruction to fall, that will be "as bread cast upon the waters," the fruit of which will be seen not many years hence.

We trust and believe that your coming will create an interest in the minds of our people on the subject of Horticulture, the result of which will be to make our homes more beautiful, our farms more fruitful, and thereby the lives of all be made happier.

Looking to this, we greet you with pleasure to-day and extend an invitation to you to come again and as often as you can make it convenient to do so, when you will find our halls and homes open for your comfort and entertainment.

RESPONSE TO ADDRESS OF WELCOME.

E. A. RIEHL, ALTON.

Mr. President, Ladies and Gentlemen:

In behalf of the Horticultural Society of Southern Illinois, I tender our hearty thanks to the mayor of the city of Mt. Vernon for this hearty welcome that he has just extended to us, and I may say in response that the Horticultural society, and horticulturists in general, are missionaries; what little we know, we are always willing to impart to those who desire information, and we will now at this meeting be willing to give this information that we have gathered from knowledge and experience and hope to learn something in return.

In discussing the different subjects of Horticulture, we hope to be benefited, and no one talking on these subjects but that will be able to give some information. While we appreciate the fact that this is not a good season for Horticulture, yet, we think our coming together will be profitable.

We are glad to meet in this thriving city, of which we all have heard so much and hope that our meeting here will not be in vain, but that you will, in a measure, be compensated for our trouble while here.

PRESIDENT'S ADDRESS.

R. T. FRY, OLNEY.

Ladies and Gentlemen:

One year ago, at the meeting of this society at Belleville, you selected me as your president for the ensuing year. We have maintained the membership and have the largest society in the State. The weather of March last blasted the hopes of a fruit crop for 1894, which had a depressing effect upon the horticulturists of our district, and most of the fruit districts of this latitude. The yield of fruit was the smallest ever known in southern Illinois.

No class of men take defeat more good naturedly than the horticulturist. His genial disposition under any and all circumstances is due to his good hard sense and constant communion with nature. His associations with the beautiful and luscious strawberry, peach and plum, and the almost endless varieties of apples, pears and small fruits make him a better man in the true sense of the word than he who spends his time and talents in the busy marts of populous cities. He sees the buds, the bloom and the tiny fruit, and watches the daily development until time arrives to pluck and eat. What can be more enchanting than such a life.

The failure of 1894 has been widespread, but the trees and

plants have rested and the pests which prey upon the fruit have been reduced to the minimum, which insures a good crop of perfect fruit the coming season. Had the season been more propitious, I think we would have had representatives from every county in this district; but the general failure coupled with the financial crises has compelled many to forego the pleasure of meeting with us.

The financial condition of our society is eminently satisfactory. Our membership should never be less than 1,000 to 1,500 and the attendance at these meetings should be from 300 to 500. The forty-one counties in this Horticultural division of the State contain some of the finest fruit lands to be found any where in the United States, and the future has in store for us a promising outlook. The work of this society has to do with determining what can best be grown, and the most practical methods of growing them, rather than engaging in figuring out profits per acre. The amateur has the right to expect valuable and accurate information as to what to plant, how to plant, when to plant, how to market, how to cultivate, from the proceedings of this society.

In the deliberation of this meeting I hope every member will take an active part to the end that we may get the best results from the proceedings. Don't be backward. Speak up. Ask questions. We are here for business rather than pleasure, although it is a real pleasure for horticulturists to meet and talk over experiences and relate successes and failures. Let us crowd into the two days set apart all the good things possible. The meeting is now in your hands.

SECRETARY'S AND TREASURER'S REPORT.

E. G. MENDENHALL, KINMUNDY.

Mr. President:

Again this office has to report an almost total failure of the fruit crop for the season of 1894.

It would seem that the membership of this society would be reduced by the hard times natural to such continued bad luck in the production of fruit. However, such is not the case; we have an increased membership over that of 1893.

In order to try and offset the effect of hard times on the membership list, have thought it best to use plenty of printer's ink and postage, to more thoroughly advertise our society among the live horticulturists of this part of the State. Have tried to impress it upon all—the fact that we want not only their own names, but others. Every member of this society could easily show one other the advantages to be obtained by belonging to it, and thus double our membership. Will you all try to get at least one new member?

Our fruit display is again put off to the future, and our hopes are set on same for the meeting of 1895. I will confine myself to a report of the business of the society for the past year, as the president's annual and the reports of vice-presidents will give the conditions of each district:

	Credit.	
Nov. 21, 1894.	By cash on hand from 1893 and receipts	$436.91
	Debit.	
Nov. 21, 1894.	To total disbursements	$172.57
	Cash balance on hand	$264.34
	Office furniture	27.00
	Total	$291.34

Your committee on secretary's and treasurer's report beg leave to state that we have examined the accounts and vouchers submitted and find them all correct.

J. Webster,
J. W. Fuller,
L. F. Dintelmann. } *Committee.*

GRAPE CULTURE.

W. E. GOULD, VILLA RIDGE.

Mr. President:

In selecting a piece of ground for a vineyard, if one has a choice, he should select a high, dry, rich, mellow piece of land. New land seems to be particularly adapted to the growing of grapes. Grapes are not nearly so hard to find suitable soil for as people generally suppose. They do not need special kinds of soil or conditions to make them a success. The manner of cultivation has more to do with success and failure in the grape growing business than anything else. We have seen grapes bear some of the largest crops vines bear in low and almost wet land. Still, this kind of land is not so well adapted for grapes, as it is not for any other kind of fruit, on account of late spring frosts. The frosts will kill them about every other year. We do not think rocky hillsides the most desirable, as is generally supposed.

The usual distance for planting grapes is 8x8, which gives 680 vines to the acre. Perhaps a better distance is 7x9, which gives

about the same number to the acre. It also gives more room for driving through the wide way.

To plant a vineyard, prepare the ground like corn ground; then lay it off with a line or other suitable contrivance. Small stakes eighteen inches long should then be placed where the vines are to be planted. The vines are then planted by the side of the stake, and always on the same side of it, with the roots spreading all one way. This is for convenience in plowing so that it can be plowed close to one side and farther away on the other. They should be kept clean during the summer and cultivated as much as a corn crop. A crop of vegetables can be raised to good advantage between them. The next winter, after the vines are planted, an eight-foot stake should be put by the side of each vine; care should be taken that it is put where the small stake was. The vine should then be cut off down to one or two buds. The next spring but one of these buds is allowed to grow. If conditions are favorable the vine will reach the top of the stake. There it should be topped. During the growing season the vine should be kept tied to the stake so that the wind will not break it off. It will require about four or five tyings. The next winter the vine should be twined around the stake and nailed securely at the top. All the side branches should be cut off close up to the vine, and the vine left again to a single switch. This will be the third season, and the vine will bear its first crop of fruit. The next winter the vine should be pruned so as to leave spurs on it; that is, each branch should be cut back, so as to leave only two or three buds to each stub or spur. These buds make the wood for the next year's crop. There should be left ten to twenty spurs on each vine. They should be evenly distributed on the upper two-thirds of the vine.

The greatest trouble with the grapes in southern Illinois is the black rot. It causes much loss in many vineyards each year. Ten to fifteen years ago it was so bad that growers almost abandoned the grape business in southern Illinois. Of late years, though, it does not seem quite so bad. There are several ways of fighting this disease, all more or less successful. When a vineyard is on a good high piece of ground, and the vines pruned and planted so as to let in light and air, they are less liable to rot. Some varieties are not so liable to the disease as others. Perkins seems almost free from rot. Ives is the most free from rot of any of the black grapes. Cottage is the next in rank. Indeed, there seems to be no difference between Cottage and Ives as to their freedom from black rot. Concord rots rather badly. Moere's Early, Champion, Roger's Hybrids, and nearly all the rest of the list, rot more or less. Some varieties rot so badly that they never show a specimen of fruit unless protected in some way.

Spraying with Bordeaux mixture has been thoroughly tried here. While it is not nearly so decided a success as is claimed for it by men who have sprayers to sell, yet it will prevent rot, if it is thoroughly and very persistently followed. It should be put on after every rain, especially during the rotting season. It will keep grapes from rot, but it entails considerable work and expense. Bagging is the only sure way to prevent rot. A paper bag, a two-pound size, pinned over each bunch, will positively prevent rot in the most susceptible kinds. It does not cost nearly so much as one would think. The bag is inexpensive and it can be rapidly put on by cheap labor. It will pay to sack grapes on account of the improvement in appearance alone. All the beautiful bloom remains on the bunch, and the the skin is of a beautiful, healthy, transparent color.

Everybody could and should grow grapes. For family use we would recommend the following varieties: Cottage, Worden, Brighton, Norton Virginia, Norfolk, Goethe. For market use would recommend Cottage, Ives, Perkins. The Cottage is a comparatively new grape and needs a little description. It is a black grape about the size of Concord. Quality very good, almost as sweet as a Delaware when well ripened; the skin thick enough to be a good shipper; a better grower than Ives and Concord; a splendid all-round grape; first for both market and family.

The grape business is one line of the fruit business that is badly neglected in southern Illinois with the exception of Villa Ridge. We think they can be grown as well all over southern Illinois if they are treated properly. We have seen abundant proof of this fact. We feel, that if the methods of grape growing were more widely disseminated, more people would grow grapes. Let us plant more good grapes.

DISCUSSION.

Mr. Riehl—There is no special soil suitable for grapes, they will grow anywhere, and everyone should grow them. As to sacking to prevent rot; that is the best method, providing the sacking is done early enough. The sacks should be put on by the time the grapes are as large as peas. If done too late, it is worse than not done at all. In the paper, the two-pound sacks are recommended; I think they are too large. We use only the one-pound sacks, except where the bunches will be very large. Speaking of the Cottage, it is not a new grape; I have grown it for several years, and have discarded it because it shells off so easily in shipping; otherwise, the quality is good; it is rather early. The Niagara is considered the best white grape with us.

Mr. Gould—I do not think it is a good plan to leave two spurs. One spur will support forty bunches; I think that is sufficient. Last year I used two-pound sacks, and put two bunches in one sack, putting them very close together. I think, maybe, it would be a good idea to wet the sacks in bluestone; I think there would be less danger of rotting the sack.

Mr. Goodrich—How do you prevent the wasps tearing up the sacks? Have you ever tried any substitute for paper?

Mr. Webster—I have not tried any substitute, but think a canvas sack might be made to answer.

Mr. Mendenhall—Mr. Chairman, I believe it went on record at Belleville that grape dust was the best preventive of rot. I use the grape dust and do not use any sacks, and I do not have any rot. If the rot starts in you can stop it with grape dust.

DIVERSITY OF FRUIT PRODUCT.

W. S. PERRINE, CENTRALIA.

Mr. President:

The prosperity of any state or nation depends, to a great extent, upon the diversity of its products. This is claimed to be one of the direct results of the great principle of protection. However, we may differ as to the means of bringing about the result, we all agree that it is a good thing for a nation to diversify its products, and what is true of nations is true of communities and individuals.

A farming community should grow more than one crop, and a fruit-growing section should produce many kinds of fruit. If a locality is adapted to the production of both farm and fruit products, both should be grown, making the one that pays the best the leading industry. Some men are calculated for plain farming, and could not make a success of fruit growing, and wouldn't if they could. Other men will make more of a success of fruit growing than of farming, and by such and for such the fruit industry should be developed.

This development of Horticulture and its associated industries is quite important. The man who is the only fruit grower in his community will have a hard row to hoe, for he cannot hope to have a monopoly of his market only for a year or two. If he makes a success, enough others will start in the business to glut the small local market. At this point their alternative is either to lessen production, or to increase and make it a general movement in the com-

munity. Fruit production, to be profitable, must be either very limited or quite general and extensive; if large, the growers can often obtain readymade packages for their fruit at low prices, and can attract buyers, when they can sell or ship at their pleasure. They can also demand and obtain cheaper rates and better shipping facilities from the railroads.

The fruit grower should grow a variety of fruits, making a specialty of one or two. These should be changed and varied according to the changes in supply and demand of the present and the probabilities for the future. His fruits should be of such kinds and varieties as to ripen all the way from spring to fall. Pursuing this plan of diversity, and distributed through the year, the grower can do a larger percentage of the work himself, or can, at least, give it his personal supervision. And, if growing on a large scale, he can give employment to men almost the year round. Help of this kind becomes skilled and in every way more reliable than that employed a few days at a time once in awhile. This is an important point in successful Horticulture, for it is the only way to obtain profitable labor.

The fruit grower should have something to sell from strawberry time until he markets his winter apples. This plan will be more profitable than the one large-crop plan, and the money made will do the grower more good, for it will come more evenly every year. With a variety, we are apt to have a crop of something with good prices. This diversity the grower must vary according to his individual makeup. Some men will not tend to their stuff if strung out through the season, but will take care of it if it comes in large quantities once or twice a year. Thus, the fruit grower should seek to know himself before he plants, but he should diversify as much as his turn will permit.

Southern Illinois is capable of becoming a great and famous fruit section, and we believe a greater diversity of fruit product than we now have will hasten that gladsome day.

DISCUSSION.

Mr. Riehl—I think it is better for each man in the community to have more kinds of fruit than one; I think it is better to have as great a variety as possible. The man that has the most varieties to sell will be the most prosperous. It has always been my purpose to have something to sell each month in the year, and while the return for any one thing may not be great yet it helps to grease the wheels. Every farmer should know himself, not only himself, but his land and surroundings; what one man may be able to grow to advantage another may

not be able to grow with profit. It depends on his own tastes and characteristics, being governed by the character of land and the manner of cultivation.

Mr. Goodrich, Cobden—When you have a large amount of any one kind of fruit, you will have to keep a great many hands to take care of it for a brief time. I try to arrange my business so as to keep a certain number of men through the season. They know what to do, and how to do it. I try to arrange my business so as to have something to ship each month of the year, commencing with the earliest strawberries and ending up with sweet potatoes. I think it requires brains to be a successful fruit grower; he has got to have brains to start with; then he wants to be there all the time and see what is going on. It also requires a good-sized pocket book.

Mr. Webster—The paper read by our secretary corresponds with my ideas on this subject. When I was a small boy, I was advised not to carry all my eggs in one basket, and I have tried to live it out. I try to have a variety of all kinds of fruit, and try to take the lead in the management of it and say, "come on, boys," instead of sending them off alone about the work. The man that will grow all apples, or all pears, or all peaches, will be left. Another thing I noticed in the paper, was the way to do the shipping. We want shippers' organizations, to secure lower rates in the shipment of our fruits.

REPORT OF FIRST VICE-PRESIDENT, SOUTHERN ILLINOIS.

J. WEBSTER, CENTRALIA.

Mr. President:

The failure of our tree fruits, especially the apple crop in 1894, is not due, nor directly chargeable to the severity of the winters of 1893 and '94, but to a combination of fungi diseases and unusual warm temperature that prevailed over a very large area of country twenty days before Easter, 1894, followed by a sudden change in eighteen hours to 14° and 16° below freezing.

Vegetables, grain and fruit received an appalling blow from a southwest blizzard or cold wave that, in the history of Illinois Horticulture, has no precedent at that season of the year; the damage was up in the millions of dollars. Asparagus, Rhubarb, Peas

Onions, Spinach, and all early vegetables, that had made such a fine start, where leveled to the ground. Gardens and fields at one fatal blow were made desolate and the crops at Centralia set back twenty days. Every kind of sets and seed, if up above ground, were destroyed, and, after a lapse of more than two weeks of cold winter weather, had to be planted again; thousands of acres of oats had been sown long enough to have clothed the newly-plowed fields with a beautiful green, pleasing to behold, only to be suddenly laid desolate by a black biting frost and an accompanying blizzard at the approach of Easter, March 24, that held all vegetation in its icy grip for a period of two weeks.

Our esteemed friends, Ben Davis, Jonathan, Minkler and others of our best market apples, in three or four more days of continued favorable temperature would have been in full bloom. *Ben* tried hard to sustain his former reputation. Plum trees, of the American and Japan types, were in full bloom, as also were cultivated crabs of various kinds, and filled the warm air with their fragrance. They were truly a thing of beauty, stimulated by the deceptive, untimely warm sunshine, when this withering, blasting, cold wave swept down upon them with all the desperate sickening furor of a wild beast.

The peach, pear, quince, grape and strawberry were so far advanced as to cause the hearts of the gardener and orchardist to fluctuate between hope and fear for the safety of their tenderest pets, not realizing that all, even the hardiest, were in danger. Strawberry fields had very many plants pushing up through the straw, so that it became apparently necessary to remove the covering. Our worst fears on the evening of March 24 were more than realized. After the battle, to take a calm survey of the slaughter by Jackfrost was appalling. Very many acres of newly-planted strawberries were totally destroyed—labor and plants of poor men worse than thrown away. The early sunshine proved to be a cruel delusion and mockery to the hustler and pushing farmers and gardeners, the season seeming to favor the laggard, completely knocking out the pushing ones the first round. The strawberry crop in the vicinity of Centralia, on the second-year fields, was so far advanced with fruit buds and tender crowns, as to be hopelessly ruined, being frozen solid when full of sap; with a few exceptions they were so badly injured in the crowns that desolation and ruin were complete.

The new fields which gave excellent promise of the first crop did not average to exceed one-fourth of the crop indicated, with a few exceptions. Nothing just like this season of 1894 had ever occured in the experience of the oldest strawberry grower; in the season there was nothing left but discouragement. Yet after the battle our people went at it again, spending their money and labor

with renewed energy, so that by the 10th day of May at least 100 acres more of small fruits were planted than the preceeding year. Prices ruled good for the small amount left the growers. A few of the careful, cautious growers, that had given the best of cultivation the preceding summer, and had not removed the mulch, were fortunate enough to have very nearly an average crop and reaped a fair compensation.

Black raspberries and early blackberries produced a fair crop, the season being favourable for this fruit throughout June. Red raspberries were generally a light crop, the canes being somewhat injured. Late blackberries, both wild and cultivated, were cut short by drouth in July; the Lawton Jr. held up until most of the crop was marketed.

Gooseberries and currants, a light crop for the first time in many years. This fruit was apparently injured by previous summer drouth and extremes of temperature in early spring. The currant measuring worm and cane borer are steadily advancing; the destruction of this fruit is certain to come soon. Only a very few of our inhabitants have taken any particular trouble to learn how to destroy this pest, or in any way check its ravages. If some persistent intelligent effort is not made at the proper time to destroy this enemy, the growing of gooseberries and currants in this latitude will be a thing of the past.

Only a few pear blooms escaped, a few Dutchess, Lousie, Bonne, Jersey and Winter Nellis were grown in our county. Peaches were generally killed by zero weather following a warm temperature in January; those buds that escaped this were caught in the general destruction at Easter. We may note here that plums and pear trees of the Japan and Orient type were caught in nearly full leaf and full of sap and therefore suffered more than other types of plum and pear. Very many trees not planted long enough to be well established were killed outright, and very many had a hard struggle to throw off the frozen sap. Three varieties of plum on our place produced a good crop of very nearly perfect specimens; they were the Arkansas Lombard, Robinson and Weaver. Vegetables of all kinds this season of 1894, although delayed, were plentiful. Early planted potatoes were plenty and of good quality; tomatoes were injured by July drouth, and the supply of homegrown were a full month late on market at Centralia. Melons of all the kinds grown where abundant and of fine quality; cheaper than we have known them in thirty years.

In conclusion, in our judgment, with cheap lands and an abundant supply of cheap fuel surrounding us, there are yet as good opportunities for young, pushing men not afraid to work at intelligent tree planting and horticulture as there has been in the past history of southern Illinois.

We cannot now, nor could we ever, recommend our young men to rush into indiscriminate fruit-tree planting, for commercial purposes, on lands that cost $60 an acre and upwards. It is a question, in my mind, if land is worth that price to grow any crops, except in favored localities in a few instances near to great commercial centers.

The failure of an apple crop for three years in southern Illinois is almost a calamity; it has been a heavy blow to all branches of farming and horticulture. It has not been due to the severity of the winters since 1891, but to causes that we had not anticipated that other sections are also liable to suffer from. We more especially refer to the damaged foliage by leaf-blight or rust, a fungus disease closely allied to apple scab, possibly the same thing. This fungus has for three or four seasons past been prevalent in the orchards so as to impair the general vigor of bearing trees, and become a very serious drawback. Scientific men, who have made a study of this disease, have demonstrated the fact that this formidable fungus enemy, under favorable conditions, is active, even before the leaf-buds on our apple trees are open.

Whether this disease can be successfully combated, with emulsion and spraying, is a question that science is laboring to answer. Whether fungus diseases are not rendered more hurtful and destructive by neglected orchards and slovenly cultivation is a question open for discussion and careful investigation. Experience and observation afford examples that leave no room to doubt that those, who carry out a system of cultivation of their orchards often enough to have at all times, through the summer, a loose surface of three or four inches, will stand the best show for fruit of good quality in bearing years.

There is an encouraging outlook for tree fruits before us, notwithstanding the prevailing drouth which is still with us at this date. On the approach of winter, drouth has been seemingly ruinous to strawberries that promised so well after the September rains. The general vigor and appearance of our fruit trees, throughout the past summer and up to the time of the leaf falling, has been much better than for four years past, especially the apple and pear. We do now think that the orchards of southern Illinois give promise, with the large acreage that has arrived at bearing age, of a much more active and prosperous future for men engaged in the fruit industry. Dr. G. R. Searles of Brooklyn, N. Y., in discoursing on the medicinal properties of apples recently said, "the apple eaten before retiring at night is good excellent brain food." It is also said to be easily digested; it excites the action of the liver, promotes sound and healthy sleep. It is also one of the best known preventives of diseases of the throat. Let us help to spread this knowledge.

[The report of the second vice-president, Chas. Hertel of Freeburg, and the third vice-president, J. W. Fuller of Anna, which cover the same ground and essentially the same statements in regard to the fruit crop, are omitted from lack of space.]

RETROSPECT AND PROSPECTIVE OF FRUIT GROWING.

T. E. GOODRICH, COBDEN.

Mr. President:

It would voice the sentiment of seven-tenths of the fruit growers of the southern district of Illinois if my paper opened with the statement, that this has been one of the most unsatisfactory as well as unprofitable seasons of all the twenty years of our society.

The storm of March 24 and 25 injured the raspberries, blackberries, and killed, outright, nearly all the buds on apple, peach, cherry and pear trees over the entire forty-one counties of our district. It is not an exaggerated estimate to say that, figuring on a basis of former years, the loss would be at least $1,000,000. Then came the drouth that scorched and injured what was left. After the drouth came the railroad strike; after the strike, and all the while we had the panic, the hard times and low prices.

The retrospect is a dark picture; let us leave it. Perhaps the prospective will be brighter.

The outlook is not gloomy. Mills of all kinds have been running on part time, or still altogether, until stocks of all kinds are running low. Our mills must soon be running nearly at full time to fill them up again. Traffic in the next two years will become very active in iron and wood, in leather and the fabrics. One line of business helps another. Fruit will be found in thousands of homes where now shut out.

During the past few years many things have been made at a loss. Every thing has been low, and fruit had to share the depression with the rest. If in the future other things prosper, the fruit interest will prosper also.

In Cobden a few days ago one of our merchants was opening a box of raisins; he told me the best now came from California. California prunes are far superior to the German. Importations of these two articles are rapidly decreasing.

What we want to do is to persuade our people to stop buying Italian oranges, and eat a better one from Florida; or better still, a southern Illinois apple; to persuade them that an onion grown on the hillsides of "Egypt" is as delicious as one grown in Spain. That a Union county tomato is far better than a native of the Ber-

muda islands. It is a hopeful sign, when England buys our apples by the hundred thousand barrels as she is doing now. Southern Illinois will furnish her share when the time comes.

Our business is entering upon an era of prosperity; and industry and skill will bring their reward.

DISPOSITION OF FRUIT.

E. S. WILSON, OLNEY.

Mr. President:

I have given but little thought to the disposal of small fruits; being principally interested in the apple, my attention has been turned to the disposition of that staple of the fruit grower, and, inasmuch as the observations relative to the disposition of the apple will apply in many instances to fruit generally, each grower can make such adoptions of my views as fits his case.

The danger that confronts us is not so much one of over-production as want of ingenuity and industry in the disposal of the crop after producing the same. It is not a matter unheard of for a shiftless fruit grower to allow a crop to go to waste for want of the requisite energy to gather it; but this is an exceptional case, but any neglect borders on this.

The market for our apples should be broadened; while we of the North are consuming large quantities of the Southern orange the lover of the apple in the South does not eat our apple because he cannot get it. We have never pushed the sale in the South. We follow too much in the ruts already worn for the disposition of our crops; it is so easy to ship to some point where we have established an acquaintance that we ship there at a loss, or even a small profit, rather than find a new market where there can be profitable sales made.

Every fruit center should form a fruit exchange. This may be a misnomer. What I mean is, the growers should hire an agent whose business it would be to hunt up markets, and these markets should not be neglected, whether the same would require a car or a train load. The agent should not be left to do all himself, but every one interested should be on the alert to assist him in gathering information. When fruit is delivered to him credit should be given, and when sold settlement should be made. When every fellow is for himself and the gentleman with horns is for the hindmost, the impecunious frequently is compelled to sell at unremunerative prices.

Rules should be established as to the manner in which the apple should be delivered; good prices in any market depend on the rigid culling of the crop. Special markets should be sought for the finer varieties of table and dessert apples, such as Grimes' Golden and Jonathan. They should be sold at gilt edge prices, and should be prepared

for that purpose. The world frequently places that value on your property that you, by your actions, show that you, yourself, place on it. The fruit grower should constantly endeavor to widen his market; he will never have to weep because he has no new territory in which to send his fruit. One of the objects to the disposal of our fruits will hereafter be cold storage.

Heretofore we have rushed our fruit to market, be the price high or low, because we had no means of preserving it ourselves. If we are to be a success as fruit growers, we must keep pace with the times and adopt modern measures and the science of the Nineteenth century. But this is too expensive for any one grower. Therefore, in addition to the agent already spoken of, the fruit growers of a district must form a joint stock company, erect their cold storage houses and then store their fruit, awaiting a more seasonable time in which to dispose of the crop than the gathering time. This will entail temporary expense but will be advantageous in the end. It is unnecessary here to enter into the details of how this shall be operated, but the suggestion will be made that the general agent already spoken of should be here retained; by giving his constant attention to the care and sale of fruit, he becomes an expert, his name will be known to buyers, and inquiries will be addressed to him by would-be purchasers. The enlargement of markets by means of cold storage would be an advantage that cannot be overlooked.

In my mind, Europe, in time, will be one of the large consumers of American fruit; ocean steamers are now fitted up with cold storage capacity for fruit, and the trade is opening up. The steamer City of Paris carries fifteen to twenty carloads of fruit each trip. Our seaport would naturally be Baltimore, and when the time arrives the vessel owners of that port will offer facilities for shipment. But as yet I have only spoken of the sale of the marketable crop; this is wholly fifty per cent of what the fruit grower will raise; the windfalls and the culls will be more than fifty per cent ordinarily. In the proper disposition and sale of this part of the crop will the grower find his profit. Evaporation will largely be a means, vinegar, jelly, canning, and distillation. Each of these will need machinery and each will need the manipulations of an expert, and here again it will need the joint effort of a community.

In fact we have come to an age when success is obtained by doing business on a large scale; co-operation must be used for preparation and sale. I cannot impress too strongly the necessity—not only the adaptation of skill and scientific appliances, but of thorough honesty. While jelly can be made out of glucose and gelatine it is not fruit jelly made out of good fruit and sugar.

This is also an age of counterfeits, but the counterfeits are not genuine and never fool the consumer twice. Establish your brand on

a high scale of excellence and keep it there. If you have the best in the market consumers will come to you, instead of you going to the consumer.

The sale of goods is one hold accomplished by judicious purchase. Cannot this be adapted to the sale of fruit? Are we as careful as we should be in the varieties we plant? How many of us make a study of the fruit we should plant before setting the same in the ground? I have no objections to raise to my neighbors' orchards, but I feel that I planted too many Ben Davis for strict honesty. The Ben Davis apple, like the peddler's razor, are raised to sell. Would not more varieties with better apples assist the sale? We plant too many winter trees and confine the sale to too short a time; our sales should commence in August; we should plant more summer varieties and, through them and their sale, introduce ourselves to the purchasing and consuming world.

We don't consume enough of our productions. I believe every orchardist should plant ten to fifteen per cent of his orchard in sweet apples, then there is always a sale at home. There is no feed domestic animals love as well as a sweet apple, they give growth of both muscle and bone to a growing animal and fatten an old one.

This may be a hobby of mine, but it is one I have practiced successfully on the farm to a limited extent, but, with some shame, I confess that in my last planting I failed to plant a single sweet apple, and I doubt if we have a single orchardist present who can give you a list of summer, fall and winter sweet apples adapted to our State.

I think on all the above places we must look for the disposal of our fruit. It would be useless to elaborate there; elaborations come only after minute acquaintance with the workings of a plan, and that experience I do not have.

But rest assured that the fruit grower is subject to all the ills that touch others in the several callings. He who can meet them with the bravest heart and most elastic spirit, displays the greatest patience and perseverance, exercises the greatest ingenuity in our coming difficulties, will in the end reap the richest reward.

DISCUSSION.

MR. RIEHL—If you undertake to ship to the smaller markets you encounter a difficulty that is hard to overcome. You all know, who are shippers of fruit, that you never have the better qualities of fruit quoted.

MR. GOODRICH—We have got to ship our fruit to the cities, because there is where we have our markets. It is not safe to ship our fruit to a small town market without a check with the order.

Mr. GASTON—There are several good things in Mr. Wilson's paper, but he neglected to mention apple canning, which would be profitable.

MR. WEBSTER—Cold storage is what we have got to come to. Apples, kept on cold storage, could be kept as fine as silk; but cold storage is expensive, and we can only reach it by co-operation.

MR. MOSS—I think Mr. Wilson made a good point on sweet apples, in his paper. A great many kinds of stock will do well on sweet apples. A good crop of sweet apples would fatten a good bunch of hogs.

MR. RIEHL—Don't plant Tollman Sweets in southern Illinois. I never got a peck of apples off one in a tree's lifetime. I have never found very many kinds of sweet apples that did well in southern Illinois, but there is one, however, and that is Bailey's Sweet.

MR. WEBSTER—Bailey's Sweet is worthless on the prairies. I think Ramsdell's Sweet are the best, but I have had to burn the trees because I could not sell them.

Mr. MENDENHALL—What about the Golden Sweet?

MR. WEBSTER—I have never had any experience with them. The Austin Sweet is a good apple, but does not keep long.

MR. MAXEY—The Ramsdell's Sweet I think are the best sweet apples.

SOME RESULTS OF EXPERIMENTAL WORK.

PROF. G. H. FRENCH, CARBONDALE.

Mr. President:

A paper that purports to give results of experimental work done this year seems to be out of place, so little fruit has been raised in southern Illinois. And yet, as one goes over the list of kinds of fruit usually grown here there is occasionally a place for comment.

APPLES, PEACHES AND PEARS.

While the crop in these three staple fruits has been a failure, the trees have made a good growth, and, if they properly mature their wood this fall, should be in a good condition for a full crop of fruit another year. The *if* I have thrown in shows one danger. The usual summer drouth closed this year September 20, with rain more or less abundant for several days, instead of closing the dry weather the latter part of September, as is the case most years. This brought out new leaves on most of the trees, apple especially, and a new growth

was started. If cold weather comes on early and suddenly, there is danger that this new growth may be in such an immature condition, and by this I mean the whole tree, that severe cold later may injure or destroy many trees, as was done nine or ten years ago.

Before leaving this part of the subject I want to give an observation made on the effect of the severe freeze of March 25 to 27, when the mercury went down to within a few degrees of zero, after the previous warm weather had pushed out leaves and even flowers on some of our fruit trees, and on others the buds were swollen enough to be killed. A Transcendent crab on my place had its leaves out two-thirds grown, and near it was a Florence crab that had leaves nearly as large, both young trees. The freeze nearly killed the Transcendent tree, all the twigs being killed, the subsequent new growth coming out from the larger limbs and trunk, but the Florence tree was not hurt, not even a leaf killed. Mr. Geo. Elliott, to whom I afterward mentioned this, said that his Transcendent tree was served in the same way. It is easy to see which is the hardier tree of these two varieties.

Among the pear trees, the sand pear seedlings—Le Conte, Kieffer, and Garber—were all nearly killed by the freeze. I have young trees of the Kieffer and Garber, and my neighbor on the north side of my place has the Le Conte, which gave me a good chance to see the effect of the freeze on these three kinds. No other kinds of pear trees were injured by the freeze except in flower bud, and these were all killed.

Among the plum trees, the March freeze treated the varieties of Japan origin in the same way it did the sand pears except, perhaps, Ogon, Botan, Abundance, Satsuma and Burbank all had their leaves partly developed and were killed, also the twigs bearing the leaves were killed back several inches. All varieties of plums had their fruit buds killed, but the other varieties were not hurt otherwise. The Japan trees put out new growth below the injured twigs and made, so far as I could see without cutting into them, a healthy growth. Cherry trees did not seem to be hurt by the march freeze further than killing the fruit buds.

SMALL FRUITS.

I have grown three kinds of raspberries, Cuthbert for red, and Souhegan and Ohio for black. The Souhegan have run out, the dry weather of the summers of 1892 and '93 being too much for them. The Ohio suffered much from the '92 dry weather, but partly recovered last year and this year made perhaps half a crop. Neither of them is as hardy as I would like, but Ohio is preferable of the two. Cuthbert has stood the dry weather and freezing all right. I have heard some complain about Cuthbert's winter killing, but I have noticed

nothing of this with mine. Some do not like the flavor of it, but so far as I have observed the Cuthbert is a good berry, solid, a good shipper and a good bearer.

Of blackberries, I have grown Stone's Hardy and the Early King. For several years I tried to get a crop from Stone's Hardy, but each time it was a failure. They would set so full that they could not develop their berries, and then the dry weather, coming on about the time they should ripen, would dry them up. Next time I would prune more heavily to see if they would not do better by setting less berries, but it would be a failure again. There would be a few berries of good size, but the most of them inferior in size and all inferior in quality. I noticed, also, that if a few were left on the bushes till they were over-ripe, that instead of being more sweet as they grew soft they were insipid. Last spring I had them cut down, dug out and burned.

The Early King comes nearer being an ideal blackberry than any other I have seen. I have fruited it two seasons and am pleased with it. Its season here is from July 1 to August 1. It is a good grower a good bearer, and the fruit is large and of fine flavor. I have a few plants of the Early Harvest that were too young to bear this year. The Early Harvest is earlier than the Early King, but not so good a berry, the fruit being too near a mulberry in looks and flavor. The Early King is a stronger and more vigorous grower than the Early Harvest.

As we are now able to control rot by spraying or sacking, grapes are the surest fruit we have in this section. The freeze of last March killed the buds that were well advanced, so that, for a time, it seemed as though this fruit, also, was going to be a failure with us this year. Later the vines put out new buds and there was nearly a full crop in this section on most of the vines that were old enough to bear. A few of my young plants set in 1893 were killed by the freeze.

I have fruited 32 varieties this year, some of them for the first time, and of these little can be said. All were grown in sacks, and of course the time of ripening here given will be a few days later than it would be out of the sacks. For convenience I will group them according to their time of ripening.

The first period is August 1, at which time Moore's Early, Early Victor, Cottage and Florence were ripe. The one I have called Florence I bought for Agawam, but instead of being a red grape it turned out to be an early black grape, something of the Early Victor type, but not so good a grape. It is very prolific, free from rot, but it is worthless after about a week from its first ripening. About this time it begins to shrivel and drop its berries from the stem. A few years ago I sent samples of it with the leaf to several prominent grape

growers. Mr. Geo. W. Campbell of Delaware, Ohio, said if it was not the Florence; he could not tell what it was. It makes a fair early grape for home use, for it can be depended on for a large crop of early fruit. Moore's Early is the best early grape I know of, one of the best in flavor and of good size, but it is only a medium bearer and rots easily, but that can be controlled. Cottage is not so good in flavor, but seems to be one of the best to withstand the ravages of disease and insects, it being one of the cleanest in foliage. Mine fruited this year for the first time, but seems to do well here.

I have two that mature their fruit August 5, Hartford Prolific and Moyer, both young vines. The first is too well known to require comment. Moyer is one of the newer varieties, a grape a little larger than Delaware, of good flavor and keeps well and is of fine appearance. They will stay on the vines a month and be good. The joints are short, leaf small, and the vine does not take up so much room as some varieties. It seems to do well here and would pay to cultivate for home use and, at least, home market.

Ives, Norfolk, Massasoit and Telegraph were ripe about the 10th of August. Ives does well anywhere and is one of our best for shipping, but is not a fine table grape. The rest are new grapes with me, but all promise well for this locality. Telegraph and Early Victor are similar except in time of ripening, and both promise well here. The others are all good table grapes, Massasoit ahead so far in productiveness; all are attractive and would make good varieties for home market.

Allow me to digress here on the question of home market. What town in southern Illinois, out side of perhaps Villa Ridge, is well supplied with grapes, through their season, that are grown near the town? I know that Carbondale is not, and I know that many other towns are not. Is not this a field for the horticulturist? By carefully selecting his varieties so as to cover the season when they can be picked daily and placed on the market, and planting so many of each kind as would supply the market of his town, would he not be better paid than in planting only one variety and having to sell a few in town and ship the balance, possibly to a glutted market? In Carbondale, Mr. T. W. Thompson sells from 300 to 1,000 pounds of Ives daily for a couple of weeks, the purchasers going to his place for the fruit, and the balance of the season the town eats grapes shipped in from other places. Will not this picture fit other towns?

Five days later, or August 15, Concord, Brighton, Lady Washington, Requa and Wyoming Red ripen. The well-known Concord, does not seem to do so well here as the Worden, which ripens a few days later. Brighton, of a dark red color, is the sweetest of our grapes, a fine variety where it can be grown to perfection. The shoots

do not always mature well, for which reason it is liable to winter kill, and it is bad about rotting. It is seldom, however, that it does not produce a fair crop. Wyoming Red is a prolific grape that needs to be thined out in this locality at the time of bagging, taking off all weak branches and pinching off all but two bunches on the strong branches. By this kind of treatment the Wyoming Red is a good grape, one that is good from August 15 to October 1, if one wishes to keep it on the vines so long. In habit it is a slow grower. Lady Washington and Requa, white grapes, fruited for the first time this season and promise well, the first seemingly the best grape. August 20, Niagara, Delaware, Worden, Goethe, Francis B. Hayes, Wilder and Ulster were ripe. I have put the Niagara down for this date for the reason that most people who raise it would call it ripe. It is soft at this time, but if left on the vines till some time in September it is a much finer grape than if eaten at this time. Last year I was prepared to say that Niagara was not adapted to this locality, but it has done well this year, as also on former years except last year. It rots rather readily, but where it can be grown to perfection is an attractive grape. The only drawback with Worden, as I have grown it, is that its bunches contain too many green berries. It is more compact in bunch than Concord and a heavier bearer here.

I understand that in some places Delaware can not be depended on. My three vines have not failed to produce a full crop since they began to bear, one vine, in the grass, producing from 200 to 350 bunches each year for the past three years. The other varieties fruited this year for the first time on my place and I can say but little about them. The F. B. Hayes seems to be of poor quality though bearing well. My Wilder does not answer the description of this variety in the catalogues, where they are said to be black, but mine are red. I have been told that some one else near here has Wilder with the same colored fruit as mine. I should not recommend the one I have.

The next period, or August 25, Lindley, Woodruff Red, Moore's Diamond, Salem and Herbert ripen. All but the first of these are new vines with me, the Moore's Diamond producing its third crop this year. Lindley is a fine red grape of the peculiar flavor that all of the Rogers red grapes have, and, besides being of excellent flavor it may be retained on the vines longer than most grapes, without deteriorating in quality. Last year a few bunches were left on the vine till October 12 and at that time they were as plump and delicious as when first ripened. The vine is a rank grower, sets full, but the bunches on my vine do not fertilize well, producing scattering bunches. I can find no other fault with it here, and possibly when some young vines of the same variety come into bearing it may do better.

Moore's Diamond is a promising grape, when fully ripe, of a rich golden yellow, bunches of good size, flavor excellent and thus far has not rotted. Woodruff Red is a little coarse in flavor but is a good bearer and promises well. Herbert is one of the most promising young vines I have. It is classed among the red grapes, and is dark red at this date, but should be left on the vines till the berries are black. If eaten when it is red it is too sour, but if left till it is black its flavor is fine.

Vergennes is the only one I had ripen September 1. This is a pale red grape of very good flavor, the pulp separating easily from the seeds, but it is not very productive here. It is a slow grower and does not put out enough strong shoots to be very productive.

About September 10 Norton's Virginia and Pocklington ripened. Both of these do well here, the first free from rot and the second nearly so. A few vines of Norton's Virginia should be in every vineyard for a late grape for home use and for home market. Pocklington does not ripen its berries evenly, those ripening first often bursting open before the rest of the bunch is ripe. It is a good bearer, the bunches are large and the flavor is fine if left on the vines till the berries are golden yellow, but it would not make an extra market grape on account of so many green berries.

The last one on my list is Noah. This ripens from the middle of September to the first of October, the berries remaining good till the first of November. Two years ago one bunch was left by accident till the sixth of November. The berries were plump and of fairly good flavor at that time. This year several bunches were left on about the same length of time with the same results; but its lateness is about the best quality this grape has, except that it is prolific. The flavor is fair, but it is one of the first to rot; its seeds are large and it easily drops from the stem in picking.

It may be well before closing to go over this list and select such as seem to do well in the region of Carbondale, and which can be recommended for home use and at least home market. Of those ripening August 1, I can recommend Moore's Early, Cottage and Early Victor. August 5, Moyer; August 10, Ives, Telegraph, Massasoit, Iona, Norfolk; August 15, Concord, Brighton, Wyoming Red, Lady Washington; August 20, Niagara, Delaware, Worden; August 25, Lindley, Moore's Diamond, Herbert, and perhaps Woodruff Red; September 1, one or two Vergennes; September 10, Norton's Virginia, Pocklington.

DISCUSSION.

Mr. Webster—I have the Clinton recommended as being free from rot, is that right?

PROF. FRENCH—It is correct, but I have not planted it; I think it is a little bit too sour.

MR. GASTON—Which is the best variety for family use?

A. The Ives.

MR. WEBSTER—I am somewhat surprised at the Professor's paper in regard to the Noah. I was not aware that the Noah was a late fall grape. I think they ripen in September.

PROF. FRENCH—I got my plants from Mr. Webster; I see, from a memorandum here in my pocket, I have the date September 15, as the date of ripening but it is difficult to tell when a white grape is ripe.

MR. RIEHL—I'll ask the Professor if the Worden is a later grape than the Concord?

PROF. FRENCH—My Worden ripens a few days later.

MR. MENDENHALL—My experience is that the Worden ripens a few days ahead of the Concord.

PROF. FRENCH—I have three vines of the Worden; I have decided that one of them is not a Worden but a Concord. There is a little difference between the Worden and the Concord.

MR. RIEHL—What is the difference? A. The Worden is a little more compact; they ripen almost together but the Worden is a few days later.

MR. RIEHL—It is evident to me that the Professor has not the Worden. The Worden is a distinct and separate grape, larger and of better quality than the Concord and ripens four or five days earlier.

MR. GOULD—My idea of the Worden is that when it is well ripened, it is tender skinned. Am I right, Mr. Riehl? A. Yes, but we can ship it though, and it usually sells 10 cents higher on each basket. The Wyoming Red I think is one of the finest grapes we have.

MR. WEBSTER—I saw the Wyoming Red at Springfield and I thought it was a very fine grape. The Wyoming is one of the grapes that has come to stay.

PROF. FRENCH—Mr. President: I agree with them in regard to the Wyoming. With us it is very prolific and grows easily. As far

as the Worden is concerned, if mine are not the genuine Worden, I would like to know it.

Mr. Riehl—If the Professor has the ground to plant them, I will send him some plants of the genuine.

Prof. French—Send them along.

THE CURRANT AND GOOSEBERRY WORM.

E. J. MENDENHALL.

Mr. President:

In writing a short paper on this subject it is probably well enough to give the description of the two kinds of worms known to fruit growers in this particular direction.

I find, on consulting the proper authorities, the following descriptions:

The currant worm, or currant and gooseberry sawfly. Larvæ, about three-fourths inches long, yellow green, feeding upon the leaves of red and white varieties; two to four broods each year.

Currant measuring, or span worm. Larvæ somewhat over an inch long with stripes, and dotted with yellow or black, feeding upon the leaves.

In volume 26, page 230 of the Illinois State Horticultural Society Reports, will be found a much more elaborate report of the imported currant worm.

My experience has been altogether with what I would call the measuring or span worm; it first makes its appearance when the berries are about the size of small peas, and if not looked after closely will defoliate the bushes, and the consequence is, the fruit makes no further growth, nor does the bush for that season, and a certainty of no fruit again the following year. Can well remember that, until within the last four or five years, in my locality this fruit was brought to town in large quantities, from all the surrounding country, by farmers who had bushes in their gardens, around the dooryard, and along the fences; all that is changed now; the report each year from these same people is, that the worms have stripped the bushes of their leaves, and no fruit; it is getting worse and worse; it is done so quickly that everyone is astonished. Still this trouble can be combatted, I think, easily. Do not wait to see the little fellows getting in their work, they are sure to be there on time; when your berries are well formed begin and go over the rows daily, early in the morning, especially if using powdered materials, as the dew helps to hold the particles; put the materials all through the bushes and over them, if using the knapsack sprayer—and it is just the thing to use in a large patch; have used London pur-

ple and found it very excellent, about same strength as recommended for apple trees.

I prefer for my own use, however, an article called arsenated thrip juice; it is put up so handy in small cans, you pour out just what is needed at a time into your sprayer for the amount of water used. Also use slug shot with large bellows, it is very effective. Both the articles can be bought of any seedsman, as they are standard goods. I have used slug shot for years. It will be necessary to follow up the dose daily or every other day at least for ten days to two weeks; it seems that they keep coming right along for about that time.

It is my opinion that this business of growing gooseberries and currants is not soon going to be overdone for the reason there are so many careless people who will not fight this worm soon enough, but let him get in his work too well before making any effort to save the crop. Find the worst infested bushes in the shady places from where they soon spread to the others. A new field may be put out and no worms seen for a few years, but they will get there all the same in due time. Eternal vigilance is the price of fruit.

PROGRESS OF FRUIT GROWING.

E. A. RIEHL, ALTON.

Mr. President:

It is often said that the fruits of the good old days, when the speakers were young, were better than they are now; or we are asked what varieties we have that are better than what we had twenty, thirty, or more years ago? And often the statement is made that the new fruits constantly being introduced are no better than what we had in the "long ago."

As my recollection pertaining to Horticulture goes back nearly fifty years, I have thought it might be of interest, and make some more contented with their present lot than they are, to give some account of what we then had and show how much better we are off now than in those good old days, that so many speak of, when all fruit trees and plants bore better and more constant crops, all fruit tasted better, the weather was more seasonable, the seasons more fruitful and the girls better and handsomer than now.

Let us take the apple first. In my father's nursery, and I think in others as well, the list of varities consisted of Esopus Spitzenberg, Golden Pippin, Yellow Bellflower, Surprise, Priestly, Newton Pippin, C. R. June, Janet and some others. The Janet then occupied the place that Ben Davis now does. Everybody wanted it, the nurseries never had enough. One of its synonyms was "Neverfail," which may give you an idea of the estimation in which it was held. Ben Davis, Minkler, Jonathan, Rome Beauty, Grimes' Golden, Maiden's Blush,

Oldenburg, Keswick Codlin, Red Astrachan, Sops of Wine, Porter and others that are old, well-known varieties now were then unknown.

In pears we were a little better off but not much, nearly all were of European origin and we had all sorts of Duchesses and Burres. The Seckel was the only American on the list. I can well remember when the Bartlett first came into notice and what a furor it created, the fruit selling for 25 cents each and the trees $1.00 a piece. Brandywine, Clapp's Favorite, Summer Doyenne, Tyson, Anjou, Clairgeau, Howell, Sheldon, Lawrence, Mount Vernon and many other good old, well-tested varieties were unknown.

In cherries we had only the Morellos and the European Heart cherries. Early Richmond, Gov. Wood, Yellow Spanish, Carnation, Elton, May Duke, Napoleon were not known.

In plums we had only European varieties and the old Chicasaw, and never got any fruit except from the latter.

Of grapes we had only the Isabella and Catawaba; all other varieties now grown have come into existence since then; needless to say we got no grapes, we know nothing about spraying and bagging. And what about small fruits? I may truly say we had none. The Antwerps were the only raspberries grown, and well do I remember when the only supply of this fruit that St. Louis received came in a market basket carried on the arm of a German gentleman living in the suburbs. No black caps were known, except the wild, and none were grown.

Blackberries were not grown, nor were any of the varieties now so extensively planted known.

The strawberries then grown were all of foreign importation, and I need hardly tell you both the fruit and the crops were small. McAvoy's Superior, Longworth's Prolific and Hovey's seedling were the first of the long list of American seedlings that have been introduced since then, and while many have failed and have been discarded and forgotten, I hardly think anyone of you would want to grow strawberries at present prices and be confined to the varieties we had when I was a boy.

Great as has been the advance in varieties, cultivation, propagation shipping and marketing, I look for yet greater and far more rapid advance in the near future. Close and rapid communication with all parts of the world gives us opportunity to get new fruits growing in similar climates in all quarters of the globe, that may be of value to us. We now are no longer dependent on chance for the production of improved varieties. We can breed plants the same as skillful breeders breed animals, and there are a number of men in this country now doing so, some making it their life work, and meeting gratifying success. The experiment stations, now established in every State, are collecting and testing all promising fruits discovered, so that we are no longer dependent on private effort. These stations have been at work a num-

ber of years and I confidently expect to see valuable results in the near future.

Have we made progress in fruit growing? I think so, most decidedly, and, what is more, I believe that the next fifty years will witness far greater improvement than have the past.

The apple that has all the good points of the Ben Davis, combined with high flavor and fine texture, is not an impossibility, and sooner or later will be produced. The strawberry that is firm enough to carry in good condition to market, is large, productive and of the best quality, will surely, in time, make its appearance; and so with all the fruits we can cultivate in our latitude.

FLOWERS.

MRS. W. BARG, CASEY.

Mr. President:

Thus far in the deliberations of this body, arguments and discussions have been confined chiefly to the cultivation and production of those things of which God said in the beginning, "To you it shall be for meat."

God's first immediate preparation for man was a garden and man's first business in this world was that of a gardener.

Now let us see what we have: He named it a garden. In the primary sense this means an inclosed place; and all the nations and peoples of the earth have recognized it. Inclosed not *from* the balance of the world so much as *to* each man his own use and sight. Most of us, perhaps, have in our memories the more primitive *kitchen garden;* but the walks to and through it were lined along with the choicest ornamented plants, shrubs and flowers obtainable, thus following out God's plan that, along with the cultivation and care of the things which make for man's meat, we should closely associate "things pleasing to the eye."

In the first few paragraphs of the Word God gives us a general history of the work of creation and then He gives us a clear idea of its uses. In this part of the story He quickly approaches the subject when he says, He "had not yet caused it to rain upon the earth and there was not a man to till the ground," and he thereupon sent up a mist from the earth and watered the whole face of the ground. And He then "formed man of the dust of the ground." He then planted a garden and there he put the man he had formed, and He tells us in a general way what he put in the garden besides man, and told him what he was to do. Now the good God had done all this for man, but He found what most gardeners also have found, that it is not good that the man should be alone, so He made him a help-

meet for him. It was not until this that Adam was fully equipped for business.

It seems to fall to the lot of woman to stimulate man to "tend the garden" by setting a good example, for it is to her hand that the average household is mostly indebted for the beautiful and fascinating things which we call flowers; and it is mainly through her influence that man stops in the mad race of life long enough to contribute his share toward their production and care.

There are some people, though, who exclaim, "What is the utility of flowers?" Indeed?—What is the utility of anything in this world? We live here either to be gratified with the things we have here, or with the hope of something we are desirous to have hereafter. You can hardly mention a thing which it is good and desirable to have but which, if you reason and examine closely, you will find that either there is in it some quality or resemblance to the flower of the field, or the contemplation or possession of it affords similar feelings of pleasure or gratification.

The song of appreciation for flowers has been sung continuously, in love, in poetery, in architecture, in decorative art, in outer adornment, in comparison everywhere, in every land, by every tongue since time began. The earth, to its uttermost bounds, whether in the ice-bound arctics, the Alpine snows or the melting tropics makes itself known and felt in its appropriate garb of flowers. In our own temperate zone, here in southern Illinois, how glorious is the profusion, how fully within the command of every one are its beauties and its gratifications!

And yet it is often possible that in going from one forty-acre farm to another, from the cramped, pinched home of the lowly to the broad city lot of the wealthy, you step from the place where flowers are kept and tended, with as much tender care and love as are the members of the household, over to where an ornamental shrub or a bewitching posy is never seen or thought of. How utterly desolate must such a place be!

Have a garden, be it never so small, where one plant, up to the very limit of time and money, shall a thousandfold repay you that which you bestow.

Have a garden in your heart and you will be likely to have one to be seen of all who pass by. Keep flowers, that you may better retain the love of your fellows. Keep flowers, that you may have one to bedeck the silent bier, that you may have one to offer to him who hath none.

What joy, what tenderness, what thankfulness, even what sadness is wrapped up in the silent yet expressive folds of a single flower.

These arguments were enough, but there are many more in a plea for flowers.

Whatever may be the glory of man, none have been arrayed like one of these.

INSECTICIDES AND SPRAYING.

PROF. G. H. FRENCH, CARBONDALE.

Mr. President:

I would regard Professor S. A. Forbes' experiments with Paris green and London purple on the codling moth and plum curculio, in 1885 and 1886, as the inauguration of the present era in economic entomology, unless we refer the new awakening in this branch by the establishing of Experiment Stations, in 1888, as separate era. Professor Forbes was appointed to the office of State Entomologist in July, 1882. One can glean from his reports that he saw more clearly each year the general usefulness of the arsenical poisons as insecticides, until, in 1885, he began a series of very carefully prepared experiments of their use on fruit trees, carrying them through that season and the next. These were the first carefully conducted and scientific experiments that had been made with these insecticides, and the publication of his methods and conclusions created a revolution in insect warfare in the orchard. Tarred rope and tin bands for canker worms, and all similar expedients, were stored away in outhouses and fence corners, and a new impetus was given to the invention and manufacture of spray pumps and nozzles—and the end is not reached yet. I see from the last number of *Insect Life* that new inventions are recently brought forward that promise still further to simplify and make more effective the use of insecticides.

While we have this gradual growth in the use of the arsenical poisons for insects that bite their food, there has been another development going on in the treatment of insects that are provided with a beak for sucking instead of jaws for bitting, and which live on the sap of plants. Without going into detail we may say that the spray of soapsuds and tobacco water for plant lice was replaced by the use of kerosene emulsions and resin sprays. The latest I have seen in this line is the proposition to so mix water with kerosene in the nozzle at the time of forming the spray as to do away with the trouble of emulsifying the kerosene.

Before dropping the historical part of this paper, mention should be made of pyrethrum or Persian insect powder as an insecticide. While this has been used to some extend in Asiatic countries for some time, its use in this country is of rather recent date. It is made from the flowers of several species of chrysanthemums, dried

and pulverized, and its value as an insecticide seems to depend largely upon the ease with which it can be introduced into the insect through the breathing pores.

Pyrethrum is now used very little, if at all, as an insecticide in the orchard. Where insects are confined to a small space, as on a rose bush, moths in a carpet, or lice on a chicken—in these situations this is an excellent remedy, easy of application and effective. But there are cases where even in small areas it is of little or no use. Such cases are where the adult insect only is the one to be reached, as in the rose chafer where the wing covers come down over the breathing pores as to close them against the introduction of such a powder. In fact, it has been found that this insect is proof against all the ordinary insecticides—the arsenical sprays being only partly effective because acting to slowly to prevent injury, kerosene emulsion, lime, kainit, tobacco, acetate of copper, digitalis, corrosive sublimate and others all proving of little or no effect. We, in this State, may consider ourselves fortunate in that, while the rose chafer is to be found in our midst, yet we are fairly secure from its harmful attacks for it does not multiply rapidly only in sandy soils.

In the use of the arsenates, such as Paris green and London purple, we may generally obtain the desired effect by using them in as small quantity as 1 pound to 250 to 400 gallons of water, but writers recommend their use in the proportion of 1 pound to 100 to 250 gallons of water. The Department of Agriculture recommends to mix the poison first with a small quantity of water in the form of a paste and combine this with the balance in the spray tank, mixing the whole thoroughly. The poisons do not dissolve in the water but are simply held in suspension, and hence a constant stirring is necessary to keep the mixture the same during the time of spraying. If the spray is to be used on the peach, it should be used as weak as 1 pound to 250 gallons of water, or the leaves may be injured. If London purple is used and a little limewater put into the mixture the spray will not injure the leaves.

As to the time for spraying, the first application should be made after the blooms have fallen. Before this year there has been much conjecture as to the effect on bees of spraying while the bloom is on tree, and much has been said on both sides. Last May Mr. F. M. Webster, entomologist to the Ohio Experiment Station, made a series of careful experiments that proved that bees and honey were poisoned by spraying trees while in bloom. This proved conclusively that in no case should the first application of the poison be made till after the blossoms have fallen. At this time the young apple presents the blossom end up where it may receive the spray, and here is where the egg of the codling moth is deposited, so that the young larvæ,

when it comes from the eggshell, takes his first meal on the part containing the most poison.

There has recently been introduced a new arsenical compound, arsenate of lead, used first by Mr. F. C. Moulton, of the Gypsy Moth Commission of Massachusetts. It was found that the "Gypsy moth larvæ would feed for days without apparent injury upon trees which have been sprayed with Paris green or London purple in a solution so strong as to somewhat burn the leaves. In fact the committee, in the spraying which they are carrying on at present, have found it necessary to use arsenate of lead in as strong proportion as 10 pounds to 150 gallons of water."

Mr. C. L. Marlatt, of Washington, D. C., says of it:

"Our experiments at Washington show that this mixture has good grounds for the claims made for it. Its advantages over the other arsenicals, it will be remembered, are its qualities of adhering to the foliage and seeming to lack entirely any caustic properties. We have used it on the tender foliage of the peach and Osage orange at a strength of one pound to two gallons of water, with glucose enough added to almost make a syrup, without the slightest injury to the plants treated. The mixture adhered to the foliage through several heavy rains and gives evidence of lasting through the summer. As to its insecticide properties, it may be stated that elm trees, with larvæ of elm leaf beetles on the leaves, were sprayed with 1 pound to 39 gallons of water which effectually destroyed the larvæ. The action of arsenate of lead if used in weak solutions is slower than that of Paris green, but it may be used where strong mixtures of Paris green or London purple cannot be used. The cost of lead arsenate, to the Gypsy Moth Commission, is given at 7 cents per pound.

In a few cases it will not do to use these arsenical preparations to destroy insects that masticate their food on account of its effect on fruit or the plants, nearly or quite grown. As an instance of this kind we may mention the imported or native currant worms. One of the most efficient remedies in this case is powdered hellebore, mixed in water, in the proportion of 1 ounce to 3 or 4 gallons of water, sprinkled thoroughly over the bushes. This is a poison to the insects, but will do no harm to the foliage of fruit.

It hardly seems necessary to say anything about kerosene emulsion to destroy plant lice, as it has been in use so long and its merits are so generally recognized. But for the reason that it is often convenient to combine this with either arsenical insecticides or fungicides, it may be well to give here a formula for making it. It may be made by using either milk or soap, but the latter is more satisfactory for the reason that the soap is itself an insecticide. With soap the formula is:

Kerosene, 2 gallons.
Soap, common or whale oil, ½ pound.
Water, 1 gallon.

Heat the water, dissolve the soap in the hot water and while boiling hot add the kerosene. Churn the mixture by means of a force-pump for five or ten minutes. If the emulsion is perfect it will form a thick cream, which will thicken upon cooling. In doing this soft water should be used, or if hard water only is attainable, add a little lye or bicarbonate of soda to the water.

To use this for scale insects, dilute the thick emulsion with 9 parts of cold water. For other insects, add 15 parts of cold water to 1 of the emulsion, or for soft plant lice, from 20 to 25 parts of water may be used.

It is sometimes convenient to combine more than one insecticide, or one or more insecticides with a fungicide. If, for instance, apple trees are infested with the apple tree plant louse and canker worm, one spraying will suffice for both insects by mixing Paris green in proper proportions with the emulsion mixture. If at the same time we wish to provide against scab on the apples, we may combine the kerosene emulsion and Paris green with the well-known Bordeaux compound, and form what may be known as "Bordeaux-mixture, kerosene emulsion and Paris green."

This mixture, without the Paris green, is one of the new combinations suggested this year, and is thus spoken of by Mr. B. T. Galloway, of Washington, D. C.: "Having used kerosene in emulsion with lime milk, the thought suggested itself that the kerosene might be added to Bordeaux mixture and thus produce a combined insecticide and fungicide. It was found upon experimenting that the kerosene would readily emulsify with the Bordeaux mixture, forming a compound more stable than the mixture alone. The insecticide and fungicide properties of the combination have not been thoroughly tested in the field. Some trials, made with a view of testing the mixture as regards its wetting power, adhesiveness and injurious effect on foliage, have shown that in most cases the preparation wets the parts almost as readily as Bordeaux mixture alone, but it does not seem to adhere quite so well. The strengths used in these trials range from 1 to 5 to 1 to 25, the 1 in each case representing the kerosene. No injury resulted to any of the plants excepting peach, which had its foliage removed by the 1 to 5 and 1 to 10 formulas. It seems to me that this is a very promising combination, and I hope it may be thoroughly tested in the field."

Mr. Galloway adds in a subsequent paragraph: "Paris green may be added to this combination in any amount desired, thus producing a fungicide and also an insecticide for both sucking and biting insects."

To those not familiar with the formula for the Bordeaux mixture, I may say that it is:

Copper sulphate, 6 pounds.
Lime, 4 pounds.
Water, 22 gallons.

Mr. Galloway recommends putting the copper sulphate into a sack and suspending it in part of the water near the top where it will soon dissolve, the solution falling to the bottom as fast as formed, thus bringing fresh water continually in contact with the sulphate. Slake the lime in a small amount of water, making a thin whitewash, strain this into the copper solution and fill up to the required amount with water, stir well, when it is ready for use.

In the fore part of this paper I referred to a new method of using kerosene as an insecticide without emulsifying it. The article referred to is from Mr. J. M. Aldrich, of Moscow, Idaho, who speaks of the new method as follows:

"We are indebted to Prof. Goff, of Wisconsin, for the demonstration of the fact that kerosene may be so mixed with water at the instant of passing through the nozzle that the making of kerosene emulsion is thereby superseded. His appliance for mixing is so arranged that the suction stroke draws on both the water and the kerosene supply, the latter being partially cut off by a stopcock to mingle the two fluids in the correct proportions. The kerosene undoubtedly remains in large globules while passing to the nozzle, in going through which it is so finely divided and mixed with the water that its action upon insects and foliage is the same as that of the kerosene emulsion."

The apparatus for using kerosene by this new process is made by the "Deming company, in the form of the perfected Galloway knapsack sprayer with kerosene attachment." Mr. H. E. Weed, of the Mississippi experiment station, reports very favorably on this method of using kerosene. Mr. Marlatt did not get so good results, however, and was led to suspect that the output of kerosene was not always in the same proportion with the water. Directing the spray into a number of jars, under different circumstances, he found that the amount of free kerosene that rose to the surface of the water in the jars varied considerably, being always a greater per cent in the first jar of any series filled, thus indicating that the flow of the kerosene did not stop in its tube simultaneously with the stopping of the flow of the water when the pumping ceased. I should think, however, that when the spraying was continuous this objection would not exist.

Bisulphide of carbon has been used as an insecticide to a limited extent for a number of years, but with such indifferent results that

it was very seldom recommended. In 1893, Prof. H. Garman, of Lexington, Ky., used it in a garden on some insects infesting some melon vines, with such good results that his report of it to the association of official economical entomologists revived an interest in the subject. He put a small quantity under a tub placed over the vines and allowed it to evaporate, thereby destroying the plant lice on the melons. This year Prof. John B. Smith, of New Brunswick, N. J., made some experiments with it on melon lice that were so satisfactory that it seems worthy of mention here. He found that if the bisulphide of carbon was poured on the ground, then covered by a box or tub, it was liable to kill the plants as well as the insects; but by using a shallow vessel it did no damage to the plants. By putting from one to two drachms in a saucedish, saucer or any shallow dish, and covering with a box, sixteen to eighteen inches in diameter, a tub or a wooden bowl, and letting it remain for an hour, it kills all insects on all parts of the plants. If the vines have begun to run they can be pulled in round the hill so as to be included in the covering. On this subject, Professor Smith says:

"I am quite satisfied that, in melon fields at least, bisulphide of carbon can be used satisfactorily and effectively. It has the enormous advantage of reaching everything on all parts of the plant, not a specimen escaping. With a stock of from fifty to 100 light covering boxes about eighteen inches in diameter, as many shallow dishes and a bottle of bisulphide, the infested hills in a field can be treated in a comparatively short time."

I would like to add to this a suggestion that seems practicable for the greenhouse and plants kept in living rooms. Very often these become infested with plant lice or red spiders, and every one who has tried it knows how difficult it is to rid the plants completely of these pests when they are once on them. If plants with the pots containing them be placed on a floor and covered with a tight box large enough to cover without breaking the plants, then a shallow dish containing bisulphide of carbon be put under the box, it will destroy all insects on the plants. I have not had an opportunity to try this on house plants, but have had a chance to try other remedies only to find that, while they destroy most of the lice or red spiders, there are always enough left for seed.

While it was not contemplated that I should speak of any particular insect in this paper, other than in speaking of insecticides, yet I am inclined to speak in conclusion of the San Jose scale—*Aspidiotus Perniciosus*—that has been found in several States east of the Rocky mountains in the last year or two. This is one of the most pernicious of the scale insects found on fruit and fruit trees in California, and it is to be regretted that it has made its appearance

in this portion of the United States. I do not know that it occurs, as yet, in Illinois, and hope it may be a long time before this will be added to our list of injurious insects. It is not particular about its food plant, as it readily feeds on apple, pear, plum, peach, cherry, quince and rosebushes. With our native wild rosebushes and crab apples as possible food plants, it would be a very difficult insect to exterminate. It has been reported from Virginia, Florida, Maryland, New Jersey, Pennsylvania and Indiana, the latter in Washington county, the middle-southern portion of the State. The remedy found effective in California has been hydrocyanic acid gas applied under an airtight tent placed over the tree infested. Vigorous measures have been taken to destroy the pest, where it has been found in the States I have named, which I hope may be effectual.

DISCUSSION.

MR. RHIEL—You have alluded to the use of bisulphide of carbon; I have understood that there is danger of its exploding if it comes in contact with fire; is that correct?

PROF. FRENCH—My plan in treating plants infected with insects is, to place them under a square box, and pour in a saucer or some dish about a tablespoonful of bisulphide of carbon; the odor will come out some in the room, but before you would get enough of the odor to cause an explosion, you would say, phew, open the window! and you'd open it, too.

MR. MAXEY—I would like to ask the Professor how this Rocky mountain scale ever advanced this way; I am scared of this fellow.

PROF. FRENCH—It is a question how it got here. In our last meeting that question was brought up and no one could answer it. So far as we know now, it appeared in a nursery in New Jersey, and it has spread somewhat from there. The scale is very small, yet it is one of the most persistent insects, and the hardest to get rid of that is found in California.

MR. MAXEY—It was first discovered in Californa, was it not?

MR. FRENCH—I think so, at or near Los Angeles. That is my recollection of it.

THE LACK OF SMALL FRUIT AMONG OUR FARMERS.

L. N. BEAL, MT. VERNON.

Mr. President:

It is a self-evident fact that there is a lack of small fruits among our farmers. The farmer who has plenty of small fruits is the excep-

tion; it ought to be otherwise, for on a farm there should be an abundance of fruit. Why not? The condition now is that the farmers have a few wild blackberries during their season, and some of them have a few canned for winter. They can also have strawberries, raspberries, gooseberries, currants and grapes, not only during their season but also to can for winter use. To get more definite information than I had in regard to this subject I asked, through our newspapers (four of them), the following questions:

First. What proportion of the farmers in your vicinity raise all the fruit the family needs of any kind and all varieties usually grown in our State?

Second. Do your farmers as a rule have good vegetable gardens?

Only about fifty per cent of the farmers of Illinois have apples—the great State of Illinois which raises more apples than the State of New York—have apples for only one-half of her farmers. In southern Illinois about seventy-five per cent. of the farmers have apples. Not this year, but generally. About one-half of this seventy-five per cent have other tree fruits—peaches, cherries, plums; but in small fruits, not one farmer in fifty has grapes, gooseberries, raspberries, or currants, and about one in five hundred has strawberries; it seems strange when we think of it. We, who know how easy it is to grow fruit for our families, think it strange that farmers generally do not try more to have all the fruit their families could use.

A candidate in the recent election who canvassed this 20th congressional district told me he put up with the farmers generally, and thought he was with them for lodging at least one hundred times, and none of them had fruit for their tables. Some say they can buy cheaper than they can raise it, but my experience in selling to them is, a few quarts of strawberries occasionally, and the grapes and gooseberries they buy is governed by the amount of money the farmer gives his wife to buy with. In most cases it is the wife who does the buying and would be glad to have more if she had the means to buy with. I want to try and induce the farmer to plant small fruits and let his family have all they can use all the time, and see how much enjoyment there is in having plenty of berries.

Most of our farmers think it is difficult to raise small fruit; but it is not more so than to raise potatoes, cabbage, tomatoes, and beans. Some think apples are all they need in the way of fruit, and they very seldom have even the apples. We read that Adam had apples in his garden and his wife got him into trouble, because he had no small fruits. If he had had a strawberry patch, no doubt Eve would have been in the strawberries, and let the apple alone and saved this world much sorrow. [Moral.]

Don't say you can't afford to buy the plants to start this fruit-garden with. Many farmers spend enough money in a year for tobacco, if saved, would buy all the plants they would need for this pur-

pose. Although I have no trees or plants for sale, I will agree to furnish the plants recommended in this paper for the amount of money an average user of tobacco spends in a year. Your excuse is that you don't know what, where, or how to plant.

Select about an acre of ground near the house where it is convenient for the family. Plow and prepare the ground in good condition—do it good; don't be afraid of a little work, because it is not for corn or oats; buy twenty-five to fifty grapevines, such as Concord, Worden, Cottage, Ives, Niagara, Perkins; plant in rows six to eight feet apart; the rows ten feet wide so you can cultivate easy by planting a row of beans or potatoes, or something of the kind. The trellis can be made when needed after your vines are growing; next get 100 or 200 black raspberries, Ohio, Tyler and Gregg, and 100 or 200 red raspberries, Turner, Cuthbert, and a few Shaffer, have your raspberry rows six feet apart and plants three feet in the row; also get twenty-five Houghton gooseberry, and some Red Dutch currants. plant these the same as the raspberries, only plants ought to be four feet apart in the row; and don't forget the 1,000 strawberry plants, 200 each of Crescent, Warfield and Buback, 100 each of Miner, Downing and Sucker State, these will fertilize the first three; for late get 100 Gandy; plant in rows four feet apart and plants fifteen to eighteen inches in the row; keep clean, and good cultivation will give good returns. Try this plan and your families will be happier and healthier and the boys will be more contented with farm life.

Why men seem so blind as to their own interests and the needs of their families, I do not know; it seems as if ignorance is bliss; but no, it is not ignorance nor altogether neglect, but they lack confidence of success, and they do not know what amount of benefit they could derive out of a good family fruit garden. If I can encourage anyone to make a more determined effort to supply his family with small fruits, my object in writing this paper will be attained. The answer to the second question in each reply received was, no!

WHAT IS BEING DONE AT OUR EXPERIMENT STATIONS.

E. A. RIEHL, ALTON.

[Director of Experiment Stations for Southern Illinois.]

Mr. President:

I am glad of this opportunity to tell our members what the stations are doing, and further call their attention to what can be done and wherein they can aid the stations and themselves.

I believe that our stations in southern Illinois are in better shape and doing more for our growers than is being done in the central and northern, as by good rights they should, our section having a larger financial interest in fruit growing than the rest of the State.

The stations are testing all the new and promising untried fruits that can be obtained, where they are thoroughly tested, and as fast as they come into bearing and their characteristics developed they are reported upon and these reports published in the State reports. It is therefore not necessary for growers to obtain all the novelties yearly advertised. It will be time enough to get them when the stations report favorably upon them. We now have growing in the southern stations eighty-three varieties of apples, thirty-five pears, eighty-seven peach, twenty-four plums, seven quince, sixty-two grapes, seventeen raspberry, sixty-two strawberry and a number of other fruits, nuts and ornamental shrubs and trees. These are not old varieties, but new and untested, and the probabilities are that among them will be found some varieties better adapted to our section than what are now in general cultivation.

The State station at Champaign is doing considerable in the same lines of work. There are in the new test orchards about 150 varieties of apples, besides the orchard planted in 1869. The main lesson learned from this old orchard is that very few of the new introductions are of more than local value. In pears, the State station is not attempting to do much, the locality being unusually subject to blight. Some varieties of Professor Budd's introduction have blighted specially bad, as have also Idaho and Clapp's Favorite.

There are some twenty varieties of plums being tested, planted in 1888, and have not fruited enough to give any decided results. Wild Goose on peach roots has been the best to bear, but the trees seem to be short lived. On their own roots the Wild Goose has not borne at all.

Of the cherries tested nothing has been found equal to Early Richmond. Of the varieties introduced from east Europe by Professor Budd, not one has given enough fruit to give a taste.

The effect of different methods of cultivating orchards are being tested, one plat being cultivated with hoed crops as beans or potatoes, one in corn, one in clover and one in small grain, the latter has made much less growth than the other three which show no difference that could be readily seen.

Experiments in spraying and other methods of destroying insects and fungus diseases are being carried on at the State station. Experiments are also under way to discover the best way to propagate valuable nuts, as the pecan and hickory. Other experiments are in progress that are of more general interest, like timber culture and testing the durability of different kinds of timber, also cutting same at different seasons of the year.

I have no doubt that much good will come out of the work being done by the stations, and much more could be done if members and fruit growers all over the country would help by sending us a few plants, trees or scions of all the valuable seedling fruits that they may

know of as growing in their vicinity, but not grown or known generally. I would especially refer to our native fruits and nuts, as the persimmon, mulberry, blackberry, pecan, hickory and hazlenut. I have no doubt there are growing in this State somewhere, single trees of these fruits that are improvements and would be valuable, such we would be very glad to get and test at the stations.

QUESTIONS.

The following questions were suggested and submitted to the society for discussion:

1. What is the cause (process) of injury to the roots of dormant trees under the action of freezing and thawing, and what is the best method of drawing the frost out of frozen roots?

Mr. Riehl—If it is to apply to trees that have been taken up and frozen in transit, if they are buried immediately in the ground, and allowed to thaw gradually, there will be no injury to the tree. The same rule will be applied to an apple that has been frozen; if they are put where they will thaw gradually, they will be as good as ever when the frost is out. In the fall of 1863 or 1864 apples froze hard on the trees before they were gathered. A great many persons allowed them to remain on the trees and lost them, while if they had been shaken off into the leaves while frozen they would not have been injured.

Mr. Maxey, Mt. Vernon—As I understood the question, it referred only to where the roots were frozen, and we sometimes get fruit trees in that condition, occasioning a loss to purchaser or nurserymen if the trees are not cared for at the proper time. The proper way to draw the frost out is to dig down into the earth and make a trench, set the trees in upright and fill in gradually with fine dirt so there will be no holes, make them airtight, and the roots, when thawed out, will be uninjured.

Mr. Webster—I had some trees that came from New York. At the time they arrived they were frozen. They were packed in boxes and we never unpacked them, but allowed them to remain packed and thaw gradually, and they came out in good condition. I frequently receive trees that are frozen. I do not unpack them, but cover them up in dirt in trenches, working the dirt down fine

among the roots, and they come out all right, when, if unpacked while frozen, they would be spoiled. There are a great many men who buy trees in the fall and place them in trenches in the ground in a slanting position and pile the dirt in on them, leaving holes for the air to get through. The consequence is the roots are frozen and the trees are lost. The trees should be set in an upright position and the dirt placed around the roots so the air cannot get in, and they will be all right in the spring.

Q. Will water thaw out frost as well as dirt?

Mr Maxey—I think, Mr. President, that water would not be safe to thaw out frozen trees. Put young trees into water and let them remain awhile and they will blister. The thawing out would be too strong. When some of our farmers receive the trees, they are not ready to set, and do not heel them properly, and when trees are put in in ditches and not properly heeled the result is the trees die. I think the best way is to select a plat of ground where it is sunny; dig your trenches, throwing the dirt all on one side; place your trees in rows next to the bank and work the dirt in fine, separating each tree by itself.

Q. Would you cover the body of the tree?

A. No, sir.

Mr. Goodrich—If the tree is injured by the frost, does it ever recover?

A. Which do you mean, a tree in transit, or one frozen in an orchard?

Q. I suppose it would be in transit, or in heeling in.

A. When the frost permanently injures it I think it will never get over it; will never make a perfect tree.

Mr. Maxey—I think, Mr. President, that the secret of Mr. Webster's success in saving his lot of trees was the cold storage. I think that was the secret of their salvation.

Mr. Riehl—I do not think it is so much the frost that does the damage as the thawing out. If you can get your trees to thaw out gradually there will be no damage.

Mr. Webster—The secret is to have them properly heeled in and excluded from the air.

Mr. Maxey—It is a fact that, some trees we receive from some nurserymen, the roots are not in proper condition. There is a kind of white mould on them. These trees ought never to be planted.

2. Are the Botans and the Abundance Plums worthy attention by southern Illinois growers?

A. Yes, provided you can successfully fight the curculio and rot.

3. Are there any of the new peaches more hardy than our old sorts?

A. There are no new varieties that we know of so far that are more hardy.

4. What has been learned in relation to the failure of self-pollenization in fruit trees? Is it thought necessary, in order to get the best crops of fruit, that different kinds should be mixed in orchard planting?

Mr. Riehl—Mr. President, that is a question that we know but very little about as yet, and the probabilities are that more benefits will be derived from cross-fertilization than we are aware of now. I believe that, by planting several kinds of standard strawberries together so that they can cross-fertilize, that they will be more productive. In planting plums, we know that some kinds do need cross-fertilization. Apples perhaps do not, but when convenient to mix the varieties it will do no harm. Some varieties of pears also need cross-fertilization. It is a question that is being taken up by the experiment stations, and it will take several years to get any definite results that we can realize.

Mr. Gaston—I am convinced that cross-fertilization is a necessity, not only among fruit trees, but forest trees as well. I have known a chestnut tree standing alone that would only bear burrs and have no chestnuts, but when other trees were planted near it, it bore chestnuts. I am convinced that the Marianna plum is a cross between the peach and plum, because it does not sprout from the root. No variety of apple will pollenize itself; so when you are planting orchards you do not want to put in one variety all together.

Mr. Webster—I think our friend Gaston is a little bit off about the Marianna plum being a cross between the peach and the

plum. The Marianna plum is a distinct variety. The matter of pollenization is a very important subject. It is a mistake to plant large orchards with only one variety. The close observer will notice that there are many kinds of fruit that do better by being mixed up.

Mr. Riehl—Mr. Gaston is correct that the chestnut does need cross-fertilization. I have known several instances of chestnuts not bearing while standing alone, but when other trees were planted near they would become fruitful.

Mr. Goodrich—There is a great deal we haven't found out, but there are some things we do know. We do know that pear trees should be placed in such close proximity that there will be but very little chance for the pollen not to be carried from one tree to another.

Mr. Beal—I want to call your attention to the old style red cherry. I find that when we have excessive rains in blooming time we have no cherries, and I attribute it to the lack of cross-fertilization, the rain washing the pollen off the blossoms. I know of plum trees being planted alone in orchards, or away from other plum trees, and they never bear, being isolated. What plums I have got I have pretty well mixed up, and I always have plums when there are any in the country.

Mr. Hartley—I have had some experience with plums; I set out an orchard with Wild Goose and other Chickasaw plums. My experience is that I have had plums while my neighbors, having Wild Goose alone, did not have plums. I attribute this to cross-fertilization. It is also so with some varieties of strawberries.

Mr. Maxey—Some men, in setting an orchard, set a border of seedlings around the edge of their orchards, thinking that the pollen from seedlings is better than from grafted fruit. Now the question arises, whether or not we would be benefited by mixing seedling trees here and there in our orchards?

A. I think not.

Mr. Barter—I would like to ask in what proportion you plant strawberries?

Mr. Riehl—There is a great deal of diversity on this point; some think they get better results by mixing in the rows, but from my own experience, I am satisfied that we would get as good results by planting them in blocks.

Mr. Goodrich—Mr. Riehl, how large an area do you plant?

A. I have planted several rows of pistillates, then two or three rows of standards, then pistillates again, and I have always had enough to fertilize.

Mr. Goodrich—One of my neighbors tried planting in squares and planted an acre of each variety, but he found that was a mistake; they did not fertilize, the squares were too large.

Mr. Riehl—I see Mr. Mitchell here; let him tell how he plants strawberries?

Mr. Mitchell—Mr. President, I have tried planting both ways. Planted two rows of one kind and two of another. I am in favor of fertilizing heavily, I get better results.

Mr. Webster—At Centralia, a great many have come to the conclusion that it the safest way to plant in rows. Three rows standard and two of pistillate.

Mr. Beal—I get very satisfactory results by planting three rows of one kind and three of another.

5. What has been learned the past year in relation to spraying for the destruction of insects and fungus?

Mr. Riehl—I think we might as well pass that question, for there was nothing this year to spray.

Mr. Williams—I commenced to spray my apple orchard with sulphate of copper; sprayed about half of the orchard with this, then finished up with Paris green. Then the freeze came on a few days later and I did not spray any more. I noticed those sprayed with the solution of copper had less rust than those that were not sprayed.

Mr. Maxey—In regard to spraying will say, that I sprayed my cherry orchard, not because I was going to get fruit, but to destroy the bark beetle. Some claim a bark beetle will not attack a tree unless it is diseased. I think different; I found my little orchard of cherries was alive with bark beetle and I didn't know what to do

except to spray. I mixed coal oil with strong lye and diluted with water and sprayed and destroyed them. In August they came again; I took raw coal oil and mopped the trees up as high as I could reach. Wherever the coal oil touched the bark beetle, it killed them.

Mr. Webster—If we can fight the bark beetle with coal oil, we certainly have gained a nice point.

Mr. Maxey—It will knock them.

Mr. Riehl—One word, Mr. President. I do not want to see this go on record without some caution. Coal oil may be a good thing, but I would caution every one to be careful, it might hurt the trees.

Mr. Maxey—I have used that kerosene emulsion strong for two seasons and never saw better results.

S. Y. Maxey—If my brother does not kill his trees with that coal oil, it is a success. I noticed the trees this morning, and the bark of the trees looked as though they had been varnished, and they are nicer than mine. It might be better to dilute it pretty heavily. It does destroy the bark beetle, there is no question about that; but the question in my mind is, possibly he may kill his trees.

Q. What proportion of lye and coal oil did you use?

A. One pint of coal oil to four gallons of lye, and then diluted with water and sprayed. The extract of lye will do if you have no leach.

Mr. Riehl—Coal oil in emulsion will do no harm if properly diluted.

Mr. Gould—I remember a few years ago, I experimented a little with coal oil. I took the coal oil can and squirted the oil on the trees; to-day I can see where I put the coal oil, there is no bark there.

Mr. Williams—In my experience in using coal oil for spraying, I did not kill the trees, but came very near it; the bark cracked and looked rough, but when the emulsion was perfect, I did not hurt the trees.

6. Is it desirable to plow orchards late in the season, say in November?

MR. GOULD—I would plow the dirt to the trees in the fall and away from the trees in the spring.

MR. MAXEY—How deep should we plow?

MR. RIEHL—If my orchard needed plowing, I shouldn't hesitate to plow now. The feeders die out every fall the same as the leaves do and reproduced the next year. I am in favor of late fall plowing and leaving the ground without harrowing until spring, but do not plow too deep.

7. Is it safe to trim orchard trees in December or January if the places where large branches are cut off are painted over at once?

I think it is safe to trim now if it is properly done.

MR. WEBSTER—My judgment is that it is as well to trim in November as any other time of the year if painted over at once. I topped some maples in the fall and some in the spring, and the ones trimmed in November are the finest trees. I am satisfied that now is a better time to trim shade trees than in the spring.

8. What new varieties of small fruits of special interest have been noticed the past season?

MR. RIEHL—In small fruits I can say that the Kansas raspberry has come to stay. It is a good thing.

MR. MENDENHALL—Mr. Riehl, do you know anything about the Winona, at your station?

A. No, sir. I will say further in regard to raspberries, that I have a few of the Eureka that proved very satisfactory with me.

Q. Are they an early berry?

A. Not as early as others, but made a very fine growth, while some of the others I had difficulty in getting started.

9. Is the Japanese wineberry of any value?

A. None whatever. No word in its favor.

MR. OTWELL—Do any of you know anything about the North Star currant?

MR. WEBSTER—Yes; I think they are very fine. I think I can say this honestly.

10. What is the most approved method of trimming standard pear trees?

MR. GOULD—Mr. President, all the pruning I do to pear trees is to keep the long shoots trimmed back; I think they do better than to let the long shoots run up.

MR. MAXEY—When do you trim?

MR. GOULD—Any time after the freezes.

MR. MENDENHALL—My method of trimming standard pear trees is simply to cut out the limbs that cross and rub each other. I don't believe in trimming pear trees very much.

MR. MAXEY—In the Keiffer pear, where they send out shoots say six feet long, how much would you cut them off?

MR. MENDENHALL—I would not trim the Keiffer at all; I get most all the fruit on the end of the limbs. It has been my experience that, when I trim Keiffers, I get longer limbs than ever.

MR. WEBSTER—My experience is different; I find it necessary to do some trimming. I think it tends to make them fruitful and of a better shape.

MR. WILLIAMS—I would like to ask what would be the proper treatment of an old dwarf pear orchard that has never been cultivated.

MR. WEBSTER—Loosen the surface and manure heavily around them.

MR. RIEHL—I do not think it is a very good plan to trim pear trees very much, and so it is with many other trees. Everyone should have an idea what the tree should be ten years hence and grow the framework of the tree first. By too much trimming of pear and peach trees you get a shaped tree that is not good. You will get pears sooner without pruning than with pruning, and the tree will be in better shape.

MR. MAXEY—I had a man come to me not long ago, claiming to be an expert trimmer, and wanting to trim my orchard. I asked him how he would trim pear trees, and he said he would cut off these long shoots. I said, "You would spoil my trees." I did not let him do it, and this is the reason why I asked this question in regard

to Keiffer trees. For my own part, I would not trim them at all except to trim out the cross limbs.

Mr. Johnston—I would like to ask whether it would be a good plan to start standard pear trees with the head near the ground; they are inclined to run up.

Mr. Gould—In my experience you might cut off three-fourths of the Keiffer pears, and then have enough left. I think it is a good idea to trim a tree while young and not let it grow up too high. Head the tree low.

Mr. Mendenhall—It certainly will not do with the Keiffer. The heads will hang low enough when bearing—in fact, will reach the ground.

11. Grapevines—Is there any advantage in having two branches from the same root, one running to lower wire and one to upper?

Mr. Gould—Mr. President, I don't think there is. With one branch you will have the advantage of working the vine both ways, while if you had two you would have to work only one way. I don't think there is anything made by bringing up two vines from the bottom.

12. What five kinds of pears are best for market to cover fall and winter demands?

Mr. Goodrich—Mr. President, it depends on a man's ideas and prejudices. If I should ask Mr. Gould, he might give me his preferences; Mr. Webster the same. Bartlett early, after that the Duchess, followed up by the later kinds, I think, would be the best. We are experimenting with the Anjou and Winter Nellis for winter.

Mr. Webster—I want to say a good word for the Sheldon; the quality is good. I would commence with the Bartlett, then the Howell, then the Sheldon and then the Duchess.

Mr. Goodrich—One trouble with the Bartlett, it is not very showy; it looks a little bit too rusty. We have got to pay some regard to the looks of fruit.

13. How far apart should dwarf and standard pears be set, and which is the better in the long run?

Mr. Maxey—I am satisfied now, Mr. President, that I have my pear trees too close together. If I had to plant again, I would not put them less than twenty feet. I would rather have the standards entire.

Mr. Gould—My experience in dwarf pear trees, Mr. President, is to put them by themselves and manure the ground. I wouldn't manure any other kind. If you put them in with the standards and manure them, it will cause blight. The Howell, I think, is the best pear.

Mr. Riehl—I can recommend what Mr. Gould has said. Do not manure your standard trees or you will lose them. I don't cultivate them at all.

Mr. Maxey—I am glad to have the item of manure brought up. I planted 600 Keiffers and manured heavily with barnyard manure, then I sowed in rye. The trees are now four years old. If I spoil my trees and cause blight, what shall I do—sow the ground in clover?

Mr Gould—I don't think they will blight; I never heard of blight on Keiffers yet.

Mr. Stanton—I don't think the Keiffer pear needs any manure at all, and I think the tree needs trimming back. If you don't trim them back, you are likely not to have fine pears. I don't think our soil is such as will produce blight by cultivation.

Mr. Mendenhall—If you trim the Keiffer back, you are likely to have neither fine nor any other kind.

14. How many believe that ashes, unleached, are valuable in fruit culture, and have made satisfactory trials?

Mr. Riehl—Ashes are said to be good fertilizers, and in the East they pay 25 cents per bushel for them; but as for me, I would not haul them for them.

Mr. Maxey—That depends upon the soil; Mr. Riehl lives where there is a good deal of limestone. On our clay soil they are a great benefit.

Mr. Webster—Ashes are of great benefit; have used ashes on potatoes, gooseberries, etc., and with marked benefit. Could tell

to the very hill where they were used. They can be used to advantage on yards and lawns; even coal ashes are good.

15. Is the culture of the dewberry to be profitable?

MR. FRY—It is the most profitable berry I have ever grown; that is my experience.

MR. ALLEN—I find that dewberries do well on poor soil.

Q. How do you cultivate them?

MR. FRY—About the same as raspberries; set in rows and cultivate the rows.

MR. MENDENHALL—My plan would be to mow them off with the briar scythe as soon as the berries are off.

MR. HARTLEY—I am not a member of the society, but expect to be soon. My plan would be to turn them right under as soon as the berries are off and sow the ground in stock peas, and you will then be ready for the berries the next spring. A man can raise a good crop of oats and get a good crop of dewberries at the same time. Plowing and harrowing will be cultivation enough for them.

MR. MENDENHALL—Do you think you could keep them in rows that way?

MR. HARTLEY—I wouldn't promise to.

MR. WEBSTER—I think the dewberry is superior to the blackberry and equally profitable. I am satisfied there would be large money here in Jefferson county in the cultivation of dewberries.

MR. MENDENHALL—I have had considerable experience in the cultivation of dewberries myself, and the only way I can control them is to mow them off and cultivate between the rows. Then in the spring go over them and cut back to about two and one-half feet, leave three or four stems to a bunch, then cultivate them again. Mr. Fry gave me a new idea about dewberries which I think I shall put into practice next spring. He puts up stakes from two to three feet high and ties the stems up to these. This will enable you to cultivate your berries, and the main thing is, you can find your fruit, as the new growth of runners in the spring will make it almost impossible to find the fruit by gathering time if the old wood remains on the ground.

Q. Did you ever try mulching?

A. Yes, sir; it is in the way, and is not necessary.

Q. Is the Lucretia a late dewberry?

Mr. Mendenhall—No, sir; it ripens with the earliest Early Harvest blackberry and matures its crop in a short time; is also a good shipper and very large.

16. What is the best late winter pear?

Mr. Riehl—What kinds have we got of winter pears?

Mr. Goodrich—There is one in St. Charles, Mo., called Krull that I am in hopes will be the coming pear for this end of the State. The Lawrence is the best I know of in this part of the country.

Q. How long will they keep?

Mr. Goodrich—Until December.

Mr. Webster—The Winter Nellis, I notice, grow up tall, and I notice they bear pretty freely. I have seen them in December, but probably November is as late as they will keep. I have seen the Vicer occasionally as late as this, but they are not first class. I could not recommend them to make money out of.

Mr. Mendenhall—Wouldn't it be as well to give the Winter Nellis as a winter pear along with the others?

17. Which are the five best peaches for the Chicago market?

(See Secretary's list as given by Gould and Webster: Early York, Thurber, Old Mixon Free, Ward's Late, Smock, Mt. Rose, Old Mixon Cling, Elberta, Red Heath.)

Mr. Webster—I don't like to leave out the Stump very much. The Old Mixon Cling is a good peach, too, with us. If I had to confine myself to two kinds, I would select the Thurber and the Red Heath.

Q. Why the Red Heath instead of the White Heath?

A. Because the White Heath dries up on the tree, and we do not get peaches off of them very often.

Mr. Riehl—The Stephen's Red Rare Ripe is a good peach.

Prof. French—The Foster is a good peach and brings a good price with us.

Mr. Webster—The Foster hasn't been very successful with me.

Q. What about the Wonderful peach?

MR. RIEHL—A wonderful failure.

MR. GOULD—The Honest John is a good peach. It ripens about the time of the Foster and ahead of the Thurber about two weeks.

MR. WEBSTER—We have tried the Captain Ede, with good success.

MR. GOULD—The Captain Ede is the best peach we ever tried except the Thurber. I still say that. I never missed a crop of the Captain Ede when we had Thurbers or anything else.

Q. What color is it?

A. Red and white.

REPORT OF COMMITTEE ON FINAL RESOLUTIONS.

Your committee beg to make the following report:

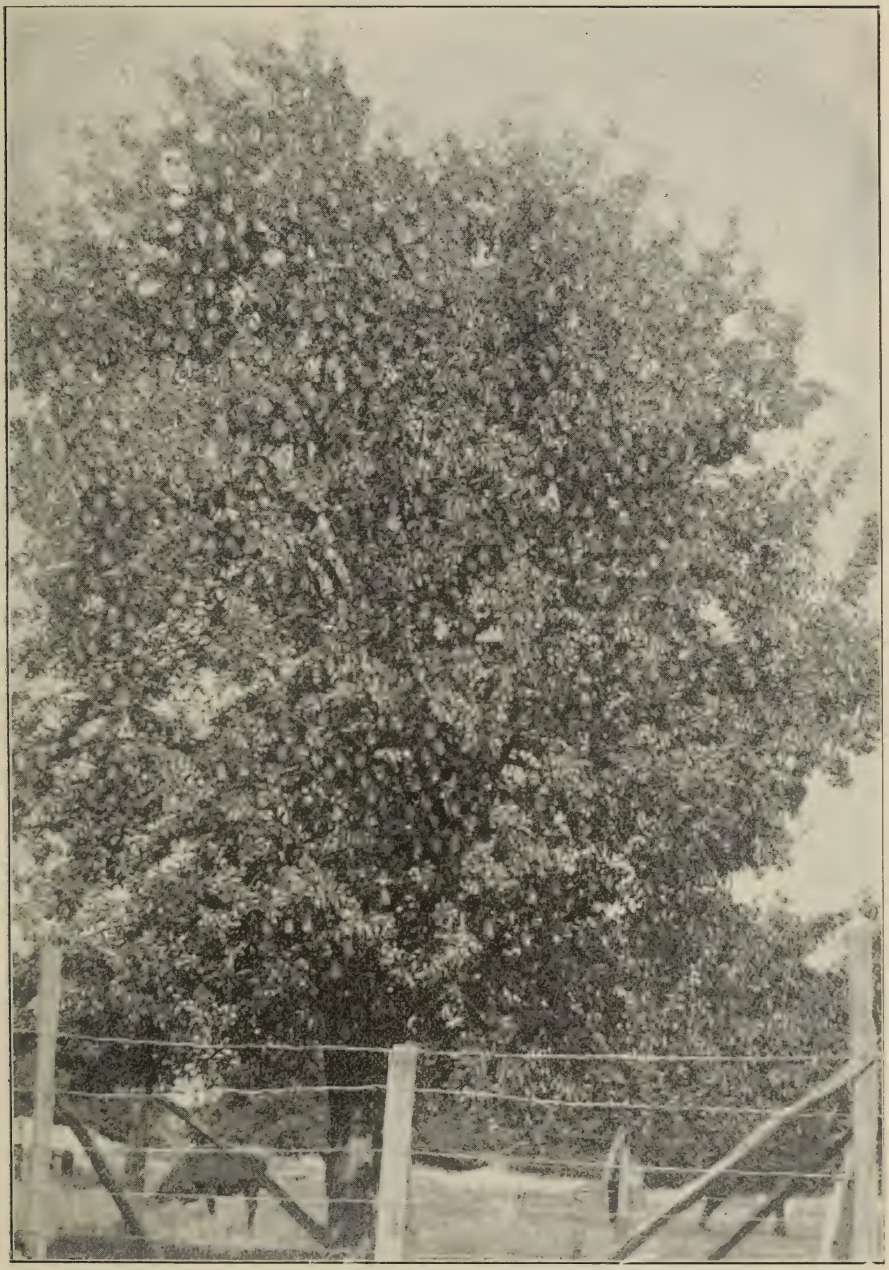
Resolved, That the thanks of the society are hereby tendered to L. N. Beal and wife for their many acts of thoughtful kindness to us as a society and to us as individuals; to all other citizens and the mayor of Mt. Vernon, who have made our stay one of profit and pleasure.

Also to the members of the string quartet, Messrs. Wolf, Wescott, Robor and Junker, and to Miss Lena and Master Bruno Robor for their musical entertainment, and to the Pleasant Grove Glee club, Messrs. T. C. Moss, T. A. Casey, and Misses Maud Moss, Gail Moss, Mary Pettet, Nellie Casey.

To the railroads for favoring us with reduced rates.

To the officers, one and all, for their untiring efforts during the past year that have resulted in this meeting, which has been one of the most pleasant and profitable in the history of our society.

T. E. GOODRICH,
E. A. RIEHL,
F. L. WILLIAMS,
} *Committee.*



A LINCOLN PEAR TREE, IN FRUIT.
NEAR LINCOLN, ILL.

[See Page 196.]

TRANSACTIONS

OF THE

TWENTY-SEVENTH ANNUAL MEETING

OF THE

HORTICULTURAL SOCIETY

OF

NORTHERN ILLINOIS

HELD IN

Princeton, February 27 and 28, 1894.

REPORTED BY

J. L. HARTWELL, Secretary.

Next Meeting at Marengo, December 4 and 5, 1894.

OFFICERS FOR 1894.

PRESIDENT.....J. V. COTTA, Nursery.

FIRST VICE-PRESIDENT.....ARTHUR BRYANT, Princeton.

SECOND VICE-PRESIDENT.....CONRAD AUSCHICK, Ottawa.

THIRD VICE-PRESIDENT.....C. U. GEETING, Rock Falls.

SECRETARY.....J. L. HARTWELL, Dixon.

TREASURER.....L. WOODARD, Marengo.

LIST OF MEMBERS

Auschick, Conrad	Market Gardener	Ottawa
Auschick, E	Market Gardener	Mendota
Baldwin, Elmer	Farmer	Farm Ridge
Barnard, O. W	Farmer	Manteno
Borop, C. E	Farmer	Princeton
Bacon, H. E	Farmer	Princeton
Breed, S. P	Farmer	Princeton
Bryant, A	Nurseryman	Princeton
Bryant, G. A	Nurseryman	Princeton
Buffet, J	Small Fruit	Dixon
Cotta, I. V	Nurseryman	Nursery
Cotta, H. R	Small Fruit	Freeport
Costa, A. H		Harvey
Cox, B. F	Sheriff	Princeton
Crownover, Day	Farmer	Wyanet
Christian, Jacob	Orchardist	Mt. Carroll
Edwards, Sam'l	Nurseryman	Mendota
Evans, W. S	Farmer	Princeton
Garrison, O	Nurseryman	Greenwood, S. Dak.
Geeting, C. U	Small Fruit	Rock Falls
Gaston, A. H	Nurseryman	Harvey
Hartwell, J. L	Small Fruit	Dixon
Hill, David	Nurseryman	Dundee
Hamilton, Jas	Farmer	Princeton
Huber, T	Orchardist	Ilinois City
Johnson, F. C	Orchardist	Kishwaukee
Krumme, W. A	Nurseryman	Alpha
McKey, W. J	Farmer	Princeton
Mayer, J. E	Small Fruit	Dixon
McCune, E. M	Small Fruit	Dixon
Minkler, S. G	Orchardist	Oswego
Piper, D. J	Small Fruit	Forreston
Prescott, C. W	Nurseryman	Marengo
Powell, C. R	Nurseryman and Small Fruit	Sterling
Persons, D	Orchardist	Marseilles
Poascharsky, F. W	Small Fruit	Princeton
Powers, Jno	Farmer	Tiskilwa
Rackley, A. C	Farmer	Malden
Sanders, Edgar	Editor	1639 Belmont Ave., Chicago

Soverhel, S. G.	Farmer	Tiskilwa
Seeley, Edmond	Farmer	Princeton
Smith, H. C.	Farmer	Princeton
Stoutenberg, S. W.	Farmer	Princeton
Salmon, H. P.	Farmer	Princeton
Swalor, Jno. G.	Farmer	Harper
Templeton, J. W.	Farmer	Princeton
Woodward, L.	Pickles	Marengo
Wirt, F. N.		
Wright, Lyman S.	Small Fruit	Ashton
Wilson, S. R.	Farmer	Princeton
Zearing, D. S.	Farmer	Princeton

LADY MEMBERS.

Bryant, Mrs. A.	Field, Mrs. Geo.	Bryant, Miss Henrietta.
Borop, Mrs. C. E.	Bryant, Mrs. L. R.	Bryant, Miss Cassa.
Johnson, Mrs. F. C.	Reed, Mrs. H. C.	Bryant, Miss Edith.

HONORARY MEMBERS.

Augustine, Henry	Nurseryman	Normal
Dunlap, Henry M.	Orchardist	Savoy
Hatch, A. L.	Orchardist	Ithaca, Wis.

PROCEEDINGS

OF THE

TWENTY-SEVENTH ANNUAL MEETING

OF THE

Horticultural Society of Northern Illinois,

HELD AT

Princeton, February 27, 28, 1894.

The sessions of the society was held in the court house, and was called to order by President O. W. Barnard, who introduced Rev. Clark who opened the exercises with prayer.

Mayor D. E. Munger being absent from the city, the president introduced Gen. S. H. Eliot who spoke as follows:

Mr. President and Ladies and Gentlemen of the Northern Illinois Horticultural Society:

I have been requested to express the gratification of our citizens at your advent among us.

They are glad to greet you and esteem it a high honor that a session of distinguished horticulturists is held in our city.

They are particularly proud that you should come to our town where, thirty-seven years ago, in this very room, the nuptial fount [The Northwestern Fruit Growers Association is referred to here], out of which grew your splendid organization, was formed and it is with no little pride that we claim this as the birthplace of a society which deservedly holds so high a place among noted organizations of this State.

People who visit us say that we have a beautiful little city. Whatever beauty it may have no doubt largely comes from the influence of your society, which was organized here so many years ago. Gentlemen, you have a magnificent territory in which to operate.

There is some discussion, Mr. President, as to the exact location of the original home of man. Were it left to the present genera-

tion to decide, the Garden of Eden would doubtless be located in northern Illinois.

[Here Gen. Eliot referred, in flattering terms, to our horticultural exhibit at the World's Fair.]

Again let me say that we are glad to see you and, in behalf of our people, would extend to you the hospitality of our city and our homes and we hope that your stay among us may prove pleasant and profitable to you.

The address of welcome was responded to by the Secretary.

President Barnard and Secretary Hartwell gave brief statements concerning the State meetings of Michigan and Wisconsin, respectively, to which they were sent as delegates, a report of which will appear in the proceedings of the State meeting.

TREASURER'S REPORT.

L. WOODARD, MARENGO.

RECEIPTS:

Feb. 8, 1893.	Cash on hand	$254.93
" 9, "	Received 24 membership fees	24.00
" 9, "	Received J. L. Hartwell 3 membership fees	3.00
" 10, "	Received of State society	50.00
	Total	$331.93

EXPENDITURES:

Feb. 9, 1893.	Paid J. L. Hartwell for services as Secretary	$ 25.00
" 14, "	Paid J. V. Cotta, as per Bill	25.75
" 14, "	Postage	1.00
" 26, "	Cash to Balance	280.18
	Total	$331.93

THE PRESIDENT'S ANNUAL ADDRESS.

O. W. BARNARD, MANTENO.

We have again assembled in our annual meeting to consider questions of vital importance to Horticulture. Our calling is one requiring the wisest counsel, the most careful and exact experimentation, the most thorough and pains-taking consideration. I therefore

trust that our deliberations may be tempered with the coolest discretion, endowed with the highest wisdom, imbued with the most liberal, charitable and fraternal feeling and good will, and result in the fruition of our most sanguine hopes.

The past year has been crowded with wonderful events pertaining to Horticulture; though not as fruitful as some years have been in the past, yet most of the small fruits, and especially grapes, have been grown in the greatest abundance in the northern district.

The greatest event of the century was the World's Columbian Exposition, held within our borders since our last meeting. Such an exhibition of the horticultural products of the world, and so grand an opportunity to study the same, may never occur again within the limits of our noble State. The fruits of Manitoba and New South Wales, of Canada and California, of Oregon and Florida, of Wisconsin and Kentucky, of Idaho and Italy, of Maine and Michigan, and other sister States and countries, and last, though not least, our own beloved State of Illinois, were placed in great profusion in grand array before our bewildered gaze. And those who failed to improve the opportunity presented on this occasion, to examine and study the great extent and variety of the fruits of the world, have missed a great pleasure and lost the opportunity of a life time. Illinois acquitted herself with great honor and credit, showing a greater variety of fruits grown upon her soil than any sister State or other section of the globe, and her capabilities as a fruit growing State were never before so palpably demonstrated by a general collection, which was kept up and maintained in its fullness to the very closing day of the fair; and our vindication was met by a liberal share of awards.

And I now feel like thanking, in this public manner, our generous lawmakers for the friendly legislation that made this possible.

As all are aware, there is one important branch of Horticulture in our section that has been under a cloud for the last decade. I allude of course to pomology, and, in approaching this subject which has been so often and so ably treated in papers and discussions before our societies, I feel considerable timidity, and it may seem "like threshing old straw," yet its importance demands the most thorough and persistent attention, for, like Banquo's ghost, "it will not down." I think I can report some progress—a glimmering of hope like the early dawn of morning appears, for hundreds, perhaps thousands, of amateur planters, and scores of experiment stations are testing and experimenting in all directions, with a view of finding the desired apple; yet it seems much like a blind search for "lost treasure." But as far as our section is concerned, I am sorry to say no pomologist possessing the necessary scientific attainments, and endowed

with sufficient zeal and financial ability to prosecute this investigation to the goal of success, has yet appeared.

And now, as embodying all the recommendation I feel like making at this time, I beg leave to quote an extract from a paper furnished by your chairman to the annual meeting of the State society, held at Jacksonville, in December 1886, viz.: "It is true that the people of the central and southern portions of the State do not feel the weight of this calamity as they do in the northern section; and to the members of this society, from this section, should this appeal come with full force. They should see that some one is found with the natural ability and proper educational qualifications, and the necessary zeal for the apple, capable of studying the *habitat* of the apple trees of the world, and supplied with ample means and set to work to solve the intricate problem of the apple tree for the northwest. As it may be the work of many years, a commencement can't be made too soon. And if we will make a beginning here, and now, and perseveringly pursue the course, I think that Yankee ingenuity will be equal to the emergency, and that success will ultimately crown our efforts, thus supplying millions of families with an abundance of the best of fruit and adding untold wealth to the country.

Inasmuch as ten years have now elapsed since the failure of our apple orchards, it might be well for this society to select a committee at this meeting to consider and investigate the whole scope of the experiments now being made in this and other States on the line of new and hardy apple trees, showing what progress, if any has been made, what the results are likely to be, making such data as they may find in a summarized form and present it to our next meeting, that the society may have the latest and most reliable information in an official and thrustworthy form.

It would seem from recent bulletins sent out from the Agricultural college of Iowa, that a goodly number of apple and pear trees have been tested there, and at experiment stations connected with the college, that give much promise of usefulness and adaptation to the conditions of the northwest.

We may make fruit growing profitable in any county in our district, if we but go at it in an intelligent and energetic manner. It was recently said, at a meeting of the Horticultural Society of Northwestern Iowa, "that the time will come when the orchards of northwestern Iowa will rival in profitableness those of California." If this prediction should prove true in Iowa, it certainly will apply with as much force to our section of Illinois, so I see no reasonable excuse for discouragement among our people for the cloud is passing away, and the sunshine of prosperity may come soon to shed its genial rays of light and warmth upon a happy and prosperous people,

a people who has learned and profited by the grand lesson of experience and adversity, and been made stronger thereby.

As a means to inspire pleasant associations and interest in Horticulture in the family, I suggest that Arbor day be scrupulously observed, by the beautiful custom of each member of the family planting a tree or shrub, to belong to the one who plants it, whence the young will acquire that deep, pure love of nature, as manifested in this simple exercise of our gentle and refining art.

The pursuit of Horticulture should not be engaged in solely for the purpose of money getting, for should this idea dominate the mind the higher purpose is lost, which is the refinement and elevation of the feeling, aspirations and sentiments of the soul; and I trust this society feels the importance of spreading this influence over the world as widely as possible, to the end that the race may rise to a higher plane of life and enjoyment.

A progressive Horticulture demands our best thought, and our best energies; we must move forward or perish, the potency of well-directed thought and effort is invincible and far-reaching in its results, and we must adopt new and better methods; our experiment stations should arouse themselves, and become more thorough and efficient in their work. Our transactions for 1893 are before you, and is a bright and thoroughly useful volume, on good paper, and is printed and bound in elegant shape, and the large supply of 5,000 copies have been issued and should be widely distributed where they will do the most good, as it embodies the experience and wisdom of the horticulturists of the State crystalized into thought.

And now in conclusion, I will add that this society should awaken to a full realization of its future possibilities, its meetings be crowded by old and young, of both sexes, and all work together with a will, and, believing that this will be the case, will not trespass further upon your time.

The president appointed the following committees:

Committee on president's address: Dr. Persons, R. L. Bryant, C. U. Geeting.

Committee on treasurer's report: W. N. Baldwin, S. G. Soverhill, S. G. Minkler.

[By the secretary: The notes of the stenographer who was employed to take a full report of this meeting were all but a small portion accidentally destroyed by his roommate before they were transcribed. This is a great misfortune, but an irreparable one, as the secretary has almost nothing but his memory from which to reproduce the discussions of the papers, which would have been a valuable contribution to horticultural literature.]

MY EXPERIENCE WITH RASPBERRIES.

C. R. POWELL, STERLING.

Mr. President:

I have raised thirteen different varieties of the reds and blacks; will take them in their order of ripening.

Souhegan I like on account of its extreme earliness, giving us a quantity of fruit when the price is high. The fruit is not large, but it is quite a good bearer. The vines are not of a very vigorous growth, but we want to plant some of them on account of their earliness.

The Palmer comes next, and I like them very much. They are a vigorous grower and branch out evenly, making a fine-looking bush. They seem to have a good hold of the ground and are not blown down easily. The vines have a healthy look and they commence ripening two or three days after the Souhegan and are a large, fine berry. They bear heavily, and it is a sight to see a bush loaded down with such beautiful fruit. They ripen all up in a short time and are a really valuable variety, and I shall continue to plant heavily of them.

The Pioneer is quite a nice berry and the vines are quite vigorous and healthy. It promises to be a valuable variety.

The Ohio we all know, and I think it a valuable variety, commencing to ripen a little after the Palmer and ending about with the Gregg. I think they are one of the most profitable varieties we have. The only fault I find with them is, the canes do not stand up quite as well as I would like.

The Gregg is a large, fine fruit, but comes into ripening late. It sells the best of any berry I raise on account of its size.

The Shaffer's Colossal is a very large purplish berry, quite tart, and a heavy bearer. It does not sell quite so well on the market, but those who have canned and jammed them once always want them again.

Of the red varieties the earliest is the Thompson's Early Prolific. They are a nice berry, a good bearer and strong cane. I shall grow more of them.

The Golden Queen, from what I have seen of them, I think will be a valuable variety.

The Turner and Cuthbert we all know.

The Gladsome Ever Bearer is rightly named. It bears at the regular time of other berries on last year's vines, but it bears profusely on the new vines. When frost comes they are loaded down with blossoms, green and ripe fruit. The fruit is dry and insipid.

I always trim my vines in the spring and cut away my old canes

at the same time, as they aid in holding up the new canes. I have trimmed in the fall, but I had to retrim in the spring, as the vines died back more or less from the old cut.

DISCUSSION.

Spring pruning for cane fruits was favored by those who discussed Mr. Powell's paper—principal reason given the old wood gave protection to the new during the storms of fall and winter.

Mr. Augustine thought the absorption of strength of the new canes by the old was not worth considering. All favored keeping the growth low by summer pruning.

Mr. Gaston favored heavy mulching to keep down weeds and retain moisture during drought.

Mr. Hartwell opposed mulching cane fruits. They would get foul in spite of the mulch, and thorough cultivation held moisture in the soil much better than mulch.

Mr. C. Auschicks wanted to know why canes from old plants did not come out in the spring so healthy as canes on new plants?

Answer—Roots of old plants have more dead tissue; are consequently less vigorous, and cannot resist the severe freezing so well.

Mr. Edwards—Has any one been troubled with the leaves of raspberries curling, and the canes being scabby?

Mr. Bryant thought the former was due to an insect and the latter was a fungus disease called Anthracuosis. Both can be prevented by spaying with Bordeaux mixture.

Mr. Augustine observed that raspberries in central Illinois had been an almost complete failure for several years, for the above reasons.

EVENING SESSION TUESDAY.

Music by Princeton Quartet, "Life is but a dream."

An off-hand talk by S. G. Minkler on the topic, "Faults of the Fraternity," was confined largely to the care, cultivation, etc., of orchards.

Mr. Minkler spoke forcibly of the importance of making contributions to an orchard, if you expect it to give you anything in

return. Ground must not be expected to serve the triple purpose of meadow, pasture and apple orchard, and do each thing well. There are but few varieties of apples that are hardy in northern Illinois, and these only should be planted, and don't depend upon the prattle of tree peddlers in making your selection. Select only tried and well-known varieties. Mr. Minkler is an old orchardist, of large experience, and believes thoroughly that apples can be grown profitably in northern Illinois.

MARKETING GARDEN PRODUCTS.

CONRAD AUSCHICK, OTTAWA.

Mr. President:

About twenty years ago my father bought eight acres of land to engage in raising vegetables and fruit. It was a hard struggle in those first few years.

We had little to help us along outside of willing hands to work. The land being only ordinary farm soil, with some of it too wet to raise anything, with improper tools and little or no experience whatever; thus, in the first few years, we could hardly make a living out of what we sold, and, if we had not paid for the land and a few dollars left, we would certainly have given it up as a bad job.

Well do I remember when together with an older brother we would load up our one-horse wagon and start for town, often the whole load could be put in one or two bushel baskets. One day I remember after peddling for about two hours, we had sold just 45 cents worth, another day we had nine bunches of asparagus, but could sell only six.

This was certainly far from encouraging, but it was a start, and I think most all new beginners will make similar experiences, although I think it is easier to start to-day than it was twenty years ago.

By all means one should get good land to begin on and then, if you have anything to sell, take it to the market yourself and sell direct to the consumer; thereby you not only get all your stuff is worth, but also learn what kinds of vegetables and what varieties are most in demand.

There are several ways of peddling; the best way I think, is to have a regular route, that is, customers where you stop every day or every other day; and try to have a variety on your wagon of any article in season; and if you have not got it yet, try and buy it even if you don't make any cash profit on it. Thereby you make yourself a good reputation and your customers will depend on you and buy of no one else.

That everything on the wagon should have a clean and neat appearance is hardly necessary to say; in selling a crop it is best not to begin until it is in good condition and you can bring in good lots right along after you start. This is better than to go over a whole cabbage field to find a dozen heads, or hunt a half day for a few radishes or a bushel of green peas.

In bunching it is always best to throw out all small and inferior specimens; take for instance a bunch of radishes with about eight or ten all good size and uniform, and it certainly looks better than if you mix in some small worthless roots.

After we learned a little about how to grow and sell vegetables and some berries, we gradually extended our garden until we raised more than could be sold with one wagon.

Our next way was to first sell part of our load to the stores or retailers and then the balance to our private customers. This worked fairly well, but was sometimes disagreeable, for when an article first came in and was scarce, the stores, as a rule, would want all of it, and then your private customers would ask if you did not have something new, as they had seen such on another wagon. Sometimes on your own, as they happened to pass while you were unloading at the stores. Then you would have to make all sorts of excuses, which were hardly better than a straight lie.

As a rule the stores only buy outright and then put their own price on it, which is often about double what they pay. They say they need a big profit to make good what goes to waste.

Now, I would be willing to allow a big profit if they would always let go to waste that which spoils. Too often they will deliver radishes that were pulled nearly a week before; green peas when the pods have started to decay; green corn that is no more green than a ripe cucumber (I admit there are exceptions); of course they often get such goods sent right back to them. The worst of it is people will often conclude, these vegetables are out of season, or there is no better to be had; of course those going to the markets themselves know better.

The remedy for this would be, that all the gardeners in our town would join together and then say, "Here, Mr. Groceryman, we will put these fresh vegetables on your stand. For every dollar's worth you sell twenty-five cents is yours. Any of it you don't sell we will replace the next day, or if in fair condition, leave it another day, but sell it for less than the fresh stock." But by no means should we allow any stale, half-rotten goods to lay in front of any store. The proper place for such is on the manure pile.

"Competition is the life of trade," is an old saying, and no doubt it is true. Nevertheless, it may prove very killing to those

concerned. If the effort is always to excel one another in quality, as well as in quantity, at a reasonable price, then it can do only good. But often there is too large amount of bad competition practiced among gardeners. Many think they can gain trade by bringing in a lot of inferior vegetables and offer them for less than others are getting. Some will make bunches smaller and smaller, till it requires three bunches to sell for five cents. Others have measures that are not standard, thereby deceiving the public.

Being desirous to extend our business, we tried shipping to some larger towns near by that were not fully supplied by home growers. The goods thus shipped were sold at retail, allowing twenty to twenty-five per cent commission. This gave such good satisfaction that for the last six years we disposed of half our crops in that way.

About shipping to commission men in larger cities, I would say that if it pays to be particular to bring only the best to the home market, it pays much more so in shipping. Besides it is important to use the right kind of packages for each article. And we should always inform the party we intend to ship to as to what we have and how large our consignments are likely to be, and try to ship regular every day.

There are a great many, I regret to say, who seem to consider these large cities a sort of dump-off place, where one may ship at any time without notice whatever they cannot sell at home. Any house of good standing will not make much effort to sell such consignments so long as they have plenty of regular shippers that supply them with all they can handle. I think if some of our shippers in the southern States would govern a little more their supply according to the demand, they would be better off. Then we would not hear so much of markets being overstocked with green peas, beans, early cabbage and potatoes in April, or even March.

Many overlook the fact that the larger class of people do not buy fresh vegetables as long as it is cold and snow on the ground, even if they are offered at a reasonable price; but the more the season advances the more inquiry there is for something green, and the most demand and best chance for the shipper is a week or two before the homegrown comes in.

That commission men are often charged as being dishonest we know only too well. A short time ago I was told that if a man goes into the commission business you can put him down as a thief. To what extent this opinion is justified I cannot tell, but that they often do show a neglect and indifference that should be called criminal, concerning the interests of the shipper, cannot be denied. In my experience I don't think I was ever credited with less than my

goods sold for, but was often put to great loss by not being promptly informed of the condition of the market. If we could get our commission men to drop us a postal every day (or if very urgent a few words per wire), stating what our stuff is selling for, little favors like that would save thousands of dollars to the growers annually.

BEAUTIFY THE HOME.

SAMUEL EDWARDS, MENDOTA.

Mr. President:

All must admit that our first parents were placed where all surroundings and occupations conspired to make existence a benison for them and an honor to their creator. Through all centuries of the world's history the crowning efforts of kings have been put forth in the planting and the care of gardens, orchards and grounds, imitating as far as possible the original Eden, wherein grew "every tree pleasant to the sight and good for food." Please note that the beautiful is, in the text, given precedence over the useful. As a people, do we not make a sad mistake in ignoring its legitimate claims upon us? How few of our rural population obey the injunction to make "the desert blossom as the rose?"

The question is often asked, "How shall we keep boys on the farm?" Make the home beautiful; plant lovely evergreens, gardens, orchards, vineyards and lawns; then care for them. Give not all their energies to growing grain and animals for the sake of making money to buy more land. Who can tell how many boys, having an innate love of the beautiful, are being attracted to cities by the lovely parks, boulevards and change of diet enjoyed in cities, which should be theirs on the farm, except in the last item it should be far superior?

FRUITS IN NORTHERN ILLINOIS.

D. J. PIPER, FORRESTON.

Mr. President:

I am a great believer in top grafting. I find the varieties do well when the stock and scions are properly mated, or adapted to each other. In top grafting most kinds do well on the Whitney as a stock, but there are some that are worthless on the Whitney. I put the Wythe on the Whitney and every one grew well for two years. One year ago every Wythe was frozen and also the Whitney stock that it was growing upon was killed to the ground, while the Salome grafted on the Whitney at the same time came out last spring without a bud being injured; the wood came out of both Salome and Whitney

as white and nice as the wood of the Duchess when in same row and same orchard. I put the Wythe on the Duchess; it came out all right; could not find a bud or twig that was injured in the least. I also put the Jeffries on the Duchess and it come out pretty fair. I only lost two or three grafts by the effects of the ice on them, but the bark got burned by the sun through the ice that was frozen to them. The sun was very bright and it was very cold, but direct rays of the sun on the ice that was clinging to the trees acted something similarly to a sunglass and burned the bark as though it had been roasted before a fire. I lost some large trees of the Lawver six inches in diameter. I lost a few Roman Stem worked on the Whitney, and every young Willow Twig that was root grafted was killed to the ground, and every Geniten was killed. They were all root grafted and most of my Tallman Sweets went by the board, and the Mann apple was colored in the wood. I planted one hundred Mann apple trees some years ago and lost all of them but three and they have been dying of consumption ever since. They were all root grafted. I have the Red Astrachan; they have stood it fairly on the root grafts and first-class on the Whitney as a stock. The Tetofsky withstands our winters well and bears fruit every year. It will do for an early apple but is not first-class. I have some of my Earliest apples worked on the Whitney and they are doing well. I think my early apple is fully as hardy as the Duchess, as I have never seen a twig or bud that was hurt by freezing or blight, and the flavor is all that can be desired in an early apple, it being about like Summer Rose in that respect. I have one tree of Pewaukee, that stands directly south of a row of evergreens, that was loaded with fine large specimens of apples; it is grafted on a seedling. I have some trees of the Northwestern Greening and Wolf River; they were not hurt in the least. The English Golden Russet stands our cold winters all right. The Yellow Transparent is hardy and is very much inclined to bear very nice fruit, but the apple is short lived; it will not keep a week when ripe. The Black Twig is doing well on the Whitney and also the Scott's Winter. I have some Sweet Pear on root grafts that were badly frozen. I had only one Walbridge that I did not top work and it was killed by freezing. I have the Osceola on the Whitney and they are doing well.

THE PLUM AND CHERRY

were drowned by too much rain while in bloom. Our old Black Cherries were frozen dead. The Richmond and Montmorency came through winter all right. The greatest curiosity that I saw last September was a peach tree that had stood out unprotected through the winter of 1892 and '93, and was full of nice large

peaches right in our northern part of the State; and the summer previous it bore a heavy crop of fine large specimens.

The Raspberries were about half a crop, except the Golden Alaska, which I think was equal to anything I ever saw in a raspberry. It is very sweet and good and the canes are as hardy as currant bushes.

Grapes were a very heavy crop and sold all the way from one to two cents per pound. Some parties are grubbing out their vines, as they say there is nothing in them.

Strawberries were about half a crop and sold readily. The strawberry worm is getting to be a troublesome thing in our section of the country; it does not stop at rolling up the leaves and eating them but goes into the berries and spoils them. I must say the Warfield is a capital berry and it loads itself very heavy when well fertilized. Haviland is a very large berry and bears good crops when properly planted and well cultivated. Pacific is a great yielder of fine large berries when well cultivated and well fertilized; give it good rich soil and it will pay you well; it yields very heavy. We picked twenty-six boxes from a row three rods long and a little over 2½ feet wide at one picking—at the second picking—and they were big fellows. The Jessie did not make but three boxes right alongside of Pacific, in same length and sized row. No. 4 did best for me last season of any strawberry I had on my place. It bore right through the season. I planted some new ones last spring, as follows: Greenville; it grew well at first, then nearly one-half the plants died from the effects of the drouth. Parker Early—one-half died. Eclipse grew pretty well and made some good plants. Princess grew well and appears to stand dry weather well; it made some very fine plants. I have some new seedlings that appear to stand the drouth remarkably well and some of them bear very fine fruit. The Mount Vernon is a very fine, large berry and a late one, and bears heavy crops of very large berries. I think the greatest failure in growing the strawberry is in not giving it proper cultivation. Put plenty of wood ashes and well rotted compost on the ground; that taken from the pigpen is best; cover the ground two inches with the compost, then plow it all under with a two-horse plow, then harrow it well, then roll the plat until you get it level and firm, then mark same as if you were going to plant corn, and cross with a light marker and set plants in the cross mark and cultivate both ways until the plants begin to run well; run your cultivator only one way through the rows as long as you can, at least once a week until middle of October. It is best to not let too many plants grew for fruit, as they will smother and kill the fruit the following season.

THE POLLENIZATION OF FRUITS.

A. H. GASTON, HARVEY.

Mr. President:

After years of experience and observation we have come to the conclusion that all seedling fruits are a cross of two parents, as much so as that all animals and birds are. No doubt but my fellow pomologists will differ with me in that regard; however, my past experience will carry me out in my claims. Pollenization can be done scientifically, but is mostly done by bees and other insects, when flying around when the trees are in bloom, carrying the pollen on their feet and fuzzy sides from one tree to another. We are thoroughly convinced that every fruit grower should have several colonies of bees located in his or her orchard expressly for pollenizing purposes. We have observed, beyond dispute, that in years like the two past, when it was so cold and wet when the trees were in bloom, the bees did not fly around, that this is the real cause why the apple crop has been such a complete failure throughout our country. Each bloom, when closely examined, contains several stamens and pistils, each pistil a little cup or mouth that stands open for a few days; the first grain of pollen that comes in contact with it, it swallows and shuts its mouth; said grain of pollen grows to the core of the embryo apple; this forms the seed that becomes a cross of two parents; the dam, or mother, is the variety of fruit growing on the tree that the pistil was on; the sire was the grain of pollen that the dam swallowed. We are convinced that no variety of fruit will pollenize itself, as strange as it may seem; if it did, all that we would have to do to produce Ben Davis, Bellflower, or any other variety of apple, would be to plant an entire orchard of one variety of apples and set several colonies of bees among them, so as to do all of the pollenizing with their own pollen, and plant the seed and raise Ben Davis, Bellflower, or any other varieties, without grafting or budding. Our opinion is that the more different varieties there are in the same orchard the better they will be pollenized and the better they will bear. We have become convinced that we can become breeders of fruits, the Duchess of Oldenburgh can be crossed with Ben Davis, the progeny be an improvement on both of the parents. There is a possibility that the apple and pear, being of the same affinity, might be crossed, bringing in a progeny of great merit. The peach and plum in the Marianna seems to be a cross. We are acquainted with a crab that was a cross by the Yellow Bellflower.

Discussion.

Mr. Gaston found few, if any, to indorse his idea that no tree could pollenize its own blooms. Most agreed that better pollenization might be secured by mixing varieties in an orchard.

Mr. Dunlap objected to the emphasis given to insect fertilization, while he conceded that it had some value. The failure of fruit blossoms to fertilize in cold rainy weather is not due, he thinks so much to lack of bees to carry the pollen as to the low temperature at the time, which prevents growth of the pollen, and to the further fact that the pollen is washed off by the rain.

OBSERVATIONS AT THE FAIR.

L. P. BRYANT, PRINCETON.

Mr. President:

The mere mention of the World's Fair brings back a flood of memories and delightful experiences to everyone who had the good fortune to pay a visit, however short, to this, the greatest exposition the world has ever seen.

Here all the nations of the earth met in fraternal association and came, not empty handed, but bearing treasures such as Troy or Greece or Rome, at the imperial height of their magnificence, never dreamed of. And especially to one whose lot it was to sojourn for an extended time amid the marvels and splendors congregated in Jackson Park, the past year, are these experinces recalled with an added force and interest.

The great White City came at last to be a home. Each broad and shining roadway, each structure, each highway and byway of this modern Athens became as familiar as the well-known nooks and corners of the old homestead.

Who can describe the wonderful exhibits there collected? Each of which had its own special interest and each class of which attracted certain interested visitors. But of all the exhibits at the fair, I think it can safely be asserted, without fear of dispute, that none attracted more attention, or were given more space, or did as much to beautify the White City as Horticulture in all its forms. And here was demonstrated to the world, as never before, the high position which Horticulture occupies among the arts of men. It is not my intention to present anything new concerning the great fair, or the art of cultivation but, inasmuch as this great art was here so important a factor, a few observations on the subject may not be uninteresting.

However astonishing the exposition appeared to the public by daylight, or shone at night in all its splendor and magnificence, at no time was its grandeur more impressive nor could it be seen in greater beauty than in the early morning hours.

One perfect morning in June we entered the City just as Aurora was rising over the gilded dome of the Administration building, bathing old Horticultural hall in a flood of light and dispelling the damp mists through whose hazy clouds the distant white structures loomed up like a far-away vision. The streets were deserted, save here and there a solitary Columbian guard paced his beat. The hard, smooth avenues, clean swept by the recent force of night-workers, and the cool, bracing air reinforced by a refreshing breeze from the lake, seem to invite a solitary stroll around the apparently deserted structures, so soon to be teeming with a restless crowd.

The temptation cannot be resisted, and we turn our steps toward the wooded island, amid whose winding pathways and solitudes we find a perfect place to enjoy these transcendent glories.

The wooded island was, indeed, one of the most pleasing features of the fair and stood as a worthy exhibit of the landscape gardener's skill. In the heat of summer it furnished most delicious rest and coolness to the weary sightseers. The oaks and other forest trees stood here and there in groups, their limbs and boughs lovingly entwined as if uniting heart and hand to ward off the scorching rays of the sun. I doubt not that on the long settees, under their protecting shade, occurred many a romantic episode and dream of sweet repose. The mass and frequent clumps of shrubbery, which lined the shores on all sides, suggested in themselves the quiet and rest to be found within their borders. Often, passing at a distance, I have stopped to admire the peaceful scene—such a contrast to the hurrying crowd that passed and repassed at my side. The willows that bordered the water's edge and bent their drooping branches over some apparently secluded nook brought to my mind remembrances of former days, which, in the heat of midsummer, we used to spend along the banks of our own Bureau.

The old log cabin of Davy Crockett, scarcely visible through the foliage, seemed to add forcibly to the reality of the scene. In the center of the island was situated the famous rosegarden, where fifty thousand rosebushes yielded their fragrance during the early morning hours. Everywhere, lining the walks on either hand, were beds of flowers of every kind and description. Even the well-known sunflower, towering high above its companions, smiled sweetly on the passer-by. The wooded island was full of treasures for all, for it gave to all that "outward sunshine, inward joy," that cannot be bought for a price.

As we turn away the familiar lines come to us:

> To him who, in the love of nature,
> Holds communion with her invisible forms,
> She speaks a various language.

For here, within the narrow circle of this island, we read volumes not written by the hand of man.

Soon over the neighboring bridge the people begin to flock in greater numbers, and we realize that another day, with all its crowds, pleasures and attendant weariness has dawned on the great exposition. They disturb our former peaceful thoughts, but by no means to our dissatisfaction, for the restless and inquisitive crowd, as it passed and repassed from morning till night, itself formed a most pleasing study to occupy your mind when all the mass of inanimate exhibits failed to interest.

We mark the well-ordered crowd; how cosmopolitan in character! Everybody is here and all classes and nations represented. I recall the sentiment of an old poetic prophesy that hinted of the time when man should meet with man in union parliament, and all the nations of the earth would swell with the growing feeling of human brotherhood. I do not remember the poet, and this was doubtless a mere play of his fancy, but here I realized for the first time the truth of his prediction. A common federation, indeed. Seemingly the gradual outgrowth of our developed civilization.

But although closely identified with Horticulture, and especially with a certain pomaceous fruit ever since the expulsion, man is not our theme, except as he claims our attention through his interest or connection with Horticulture.

It was our fortune, good fortune, indeed, to spend a large share of our time in what we consider the most delightful place amid all the palaces of that fair city, the fruit section of Horticultural Hall. Here was elysium itself, filled with a delightful aroma, and to the weary sightseer a haven of rest. The island had nature's solitude, but here she seemed to have poured out in various tempting arrays the full bounty of her riches.

Ah! what was more refreshing to mind and body than a walk through those long halls, filled on either hand with fruits of every variety and clime? The fragrance pervading the whole filled one with a powerful stimulant, while the wild profusion of beauty and color on every side was a most agreeable change to the noise, whirr and monotonous sameness that was too characteristic of all exhibits.

Covering 1,600 square feet of space, the luscious fruits of Illinois were displayed on two long tables, flanked at one end by a

shorter table and a pavilion, a triumph of architectural beauty, the whole forming a picture of the wealth and resources of the State not soon to be forgotten by anyone who saw it. Nor did the scene belie the reality. The quantities of fruit that poured into the building for Illinois was an eyeopener to our neighbors, who, leading the list of fruit-growing States, nevertheless were seeing themselves eclipsed by a State throughout whose entire length and breadth the fruit crop was a pronounced failure.

Although the fertile soil, the genial climate and the varying degrees of latitude in our State offer unsurpassed facilities for the production of any variety of fruit that a temperate climate admits of, yet in the Illinois exhibit the supremacy of the apple in that State was clearly shown. But what does that State lack that can produce an apple to perfection? Surely nothing. The State that has the apple has a strong foundation.

John Burroughs says: "Not a little of the sunshine of our northern winters is surely wrapped up in the apple. How could we winter over without it? How life is sweetened by its mild acids! A celler well filled with apples is more valuable than a chamber filled with flax and wool. So much sound, ruddy life to draw upon, to strike one's roots down into, as it were."

Here, indeed, was an ideal place for the study of human nature, and here, not from his deep interest in Horticulture, but from his too intimate association with her products, man often claimed our attention. He is a creature of desires, and while, perhaps, he should not be censured for yielding to the temptations so enticingly placed before him, yet it was often necessary to impress upon him the desirability of self-restraint. But he often yielded, as man is wont to do, and I doubt not that the desire for apples fled, never to return to those who, unobserved, slipped a large highly colored specimen into their pocket, with visions of bliss and future happiness which I fear were never realized. Often, in some inconspicuous place on the tables we would find in our morning renovations a lonely Ben Davis, pierced on its nether side by the teeth of some unfortunate, which told its own romantic story.

Very noticeable and surprising was the ignorance of many people regarding our commonest fruits, who seemed to know nothing of the rich products of nature that tickle the palates of our farmer boys from their youth up. Unfortunate indeed are they who know not the taste of fresh fruit; they have yet to taste the joys of life.

It is said that no two people have the same ideas, and so it has been demonstrated. Some, the magnificent display of Illinois, would strike with the full force of its greatness and would call

forth uncontrollable exclamations of surprise and delight. The next one, who had come with the expectation of seeing something entirely beyond the limit of reason or possibility, would pass it by as they did everything else, with a disappointed air and perhaps a sarcastic remark, and so go through the whole exposition, unsatisfied and unrewarded.

We often hear of the devotion of the painter to his brush, the scholar to his books, but no man is more devoted to his profession, whatever it is, than he who works with nature to develop her inexhaustible resources and to bring forth the luscious products of tree and vine.

We have in mind a man, apparently of the older school of thought and customs, who, with a carpetbag in one hand and a commodious lunch basket, with a tin cup strapped to the handle, in the other, appeared suddenly on the scene one memorable morning last October. He was fresh from the fields and from the hand of nature, and, as he found himself thus suddenly transported into the abundant array of nature's products, his face lit up with a smile which soon broadened into a laugh that echoed and re-echoed down the long building. Running to the door, in the exuberance of his spirits, he summoned his wife with the words: "Mary! Mary! I've found it at last. Here for three days we've been hunting and walking along right in the shadder of this place, as it were, and never found it. Why, this is all that I came here to see." And, after the excitement of the first discovery had passed away, they passed along to spend a day of solid joy amid these wonders that so deeply interested them.

We see with added force the truth of Shakespeare's saying: "All the world's a stage and all the men and women merely players." We might go on indefinitely taking glimpses from this great drama of life, but time forbids.

The exposition was a great object lesson. On the shores of Lake Michigan six hundred acres of what consisted of sandbanks, bog and scrub were transformed to one of the most beautiful parks in the world. It has proven how even the most dreary tract of land may be changed to a scene of beauty. To the rural population this will be especially instructive by showing how, in every town, village and hamlet in our fair land the united efforts of a few fellow-townsmen may greatly improve the rough appearance of nature about their native place.

The *manner* of its accomplishment was very important. Mere grading, dredging and leveling do not suffice to give beauty. Pleasing effects must be produced; and it was the skill which added these touches to the natural resources already at hand that trans-

formed the bog and desolate marshes to a beautiful garden, dotted here and there by the placid waters of the lagoon.

The fair has passed, the great structures are vanishing one by one, but in the minds of the millions who enjoyed its pleasures are stored up fadeless mind pictures and delightful memories of their happy visit that will give to many a dull hour the brightness that makes up the true charm of life.

DISHONEST PACKING AND MARKETING OF FRUIT.

C. A. SHAMEL, ASSOCIATE EDITOR O. J. FARMER.

Mr. President:

It is a part of my duty, during the small fruit season especially, to report the fruit markets of Chicago, which, as you know, are largely on South Water street. In this work I have a good opportunity of observing the various and varied methods of packing and marketing all kinds of fruits and vegetables. A regular inspection of this trade for several months will convince anyone that all dishonest men have not yet reformed nor have they disappeared from earth. While in many cases their work was not apparent without somewhat careful observation, instances almost without number are constantly coming to light in which fraud and deception are being practiced by some one at some time, during picking, packing, transportation or handling, by commission or sales' merchants. This is not only apparent from an examination of fruits offered, but the very noticeable distrust with which customers look upon the boxes, baskets, crates or barrels; for so often have they been defrauded that they take for granted that there is decayed, damaged or inferior grades below the surface, and usually will not be satisfied until they have positive proof that such is not the case.

That such a state of affairs is undesirable for the fruit grower goes without saying. People will not buy freely of any commodity if they are constantly in danger of being cheated. It is to your financial interest at least to sell every package possible; and I think you will agree with me when I state that I believe the health and general prosperity of any community of people are increased and improved by the consumption of all kinds of fruits. This has been proven over and over again and is recognized by our best physicians.

A friend of mine who spends a great deal of his time attending farmers' institutes, dairymen's conventions, etc., recently remarked to me that it was his observation that horticulturists were the most healthy, thrifty and well-to-do class of country people and asked me if I could explain why. I replied that I thought it was due in part, at least, to the fact that fruit of different kinds, prepared in different ways, formed a considerable part of their daily food. And is this not so? Has it

not been your experience? If this then be true, it can readily be seen how important it is to prevent, if possible, and at least lessen practices which in any way check the general consumption and thus limit the production and free distribution of all kinds of horticultural products.

Injuries to the fruit trade in this line come, in general, from two sources, viz.: the grower himself, and the commission or sales' merchant. The grower himself does harm by producing and shipping poor fruit. While strictly speaking this may not be dishonest, it greatly injures the trade, for no one wants inferior goods. It has been demonstrated that by a careful selection of varieties, thorough culture and picking at the proper time, a good grade of product can be secured about as cheaply as a poor one. Good fruit gathered when over-ripe has the same effect on the market. Mixing inferior with good is a bad practice. Better sort and ship several grades, distinctly labeling each and sell for what it really is.

The old practice of putting the best on the top and the poorest on the bottom is still on deck with the usual, if not an increased, number of variations. When it is expected that the lower part of the package will be examined as well as the top, packers have been known to line the bottom and sides with good fruit and fill the interior with knotty, and worm eaten, and partially decayed specimens, so that unless the contents are almost entirely removed the deception cannot be detected. Inferior varieties are also used in the same way, topping out with some good kinds. This is especially true with grapes, currants, cherries, etc.

Boxes with raised and false bottoms are still with us. Cutting off corners of boxes is also extensively practiced. The packers claim this is necessary for ventilation when they are placed in crates, which is all very true, as they ship and keep better when so treated; but in doing this the box is not always made correspondingly larger, hence full measure is not given. But perhaps the most contemptible and most largely practiced fraud of all is what is known as "shaving" packages. That is, a grower claims to use packages of a certain size, say for peaches a one-sixth bushel or one-sixth peck basket. Instead, however, of putting all his fruit in baskets of that size, he has one-seventh and one-eighth peck baskets, which, being so near the size of the regulation one-sixth peck basket, are not detected by the customer. Of course the loss at any one time is not great, but in the aggregate it amounts to considerable. The same deception is practiced with apples. Instead of shipping in full-sized barrels, those with eighteen-inch heads, or the ordinary flour barrel (holding three bushels), those with fifteen, sixteen, sixteen and one-half or seventeen-inch heads, are used.

The practice of "facing" is all right in principle. A grower has a right to display his products in the most attractive shape and condition possible, but the upper layer should fairly represent the contents of

the barrel or package. Covering peaches with the red or purplish netting gives them a redder and better appearance than they really possess, just as fruit or vegetabtes displayed in cylindrical glass jars look much larger than they really are.

Now for the commission men. Room for dishonesty on their part is probably largest in making returns to the producer. He may cheat him outright by reporting sales at a lower figure than was really obtained, but there is considerable danger of this being detected, hence the practice is not so common. When he receives a shipment of fruit, a carload of apples for example, he often finds it necessary to repack and rebarrel them in order to sell to advantage. Suppose then, upon repacking and regrading a consignment of fifty barrels of fruit, he gets twenty barrels of first-class fancy fruit which sells for $5.00 per barrel; twenty-five barrels of medium grades for which he gets $3.00, and five barrels which bring only 75 cents each. The total amount received at this rate would be $178.75. If he be dishonest, he will make out his return bill for fifty barrels at $3.00 a barrel on the amount received for the medium grade, which will amount to $150 or $28.75 less than he actually received. This at one time was quite common and I am informed, on good authority, that it has diminished but little.

This same practice is indulged in the live stock trade. When a steer goes to market and is thought to be affected with lumpy jaw, the State Inspector takes charge of it. If upon examination he is found to be only slightly affected, the steer is returned to the commission merchant who is permitted to sell him in the market with the remainder of the herd. He then gets a good price, but he reports this animal condemned by the State Inspector, and returns $6 or $8 to the shipper, as this is the average price of a condemned carcass. The average price of the steers in the lot may be $40.

In regrading the fruits, the fruit commission merchant finds a large field for exercising and developing any dishonest faculties and traits which he may possess. It is here that the greatest amount of "shaving" is done. He packs apples in barrels of different dimensions, yet so nearly alike that the buyer will not detect the deception. Baskets of peaches, pears, and even cherries and plums are treated in the same manner. The farmer does some of this, but not so much, for he may be naturally more honest, or more probably because he knows he cannot very well deceive the experienced commission men. As insignificant as this may seem, it is practiced to a great extent by many dealers in our great cities. Then, too, the commission merchant is adept at "facing," putting poor grades or varieties in the center or bottom of the package; nor are false or raised bottoms, cut-off corners, etc., strangers to him.

But allow me to suggest before leaving this phase of the question that some of the practices of the growers force, or at least make it possible for the commission man to be dishonest. Every time a con-

signment of poor, uneven, over-ripe or badly packed fruit is sent to market the producer thinks he ought to get as good a price for it as his neighbors; so, in order to keep peace in the family and hold the trade, the commission merchant is obliged to regrade it, to resort to deception and fraud in packing and selling to get even a fair price. Uniform lots are received regularly for some time; then, without warning, in comes a poor shipment. The merchant sells this and probably loses by it; then in order to protect himself, he deducts this loss from the returns of the next shipment. So you can easily see that there is room for improvement on both sides. While, undoubtedly, the middlemen are the most at fault, they must not be compelled to carry nearly all the blame, for they don't deserve to. We hear of the proverbial honesty of the farmer, and as a rule I believe most of them are honest, but some are not. I have lived all my life up to the last two years among farmers, am a farmer myself and know their practices, and while they probably would not undertake large swindling schemes, they do little things which are just as bad in principle and which give a disreputable name to the branch of the industry they follow just as they have in this matter of marketing fruit. I appeal to you and want an honest answer when I ask if it don't seem to be almost second nature to, when handling corn which has been somewhat poorly husked, pick off the husks on the top of the load, hoping the elevator man, when dumping, will fail to see the difference? Don't you pick the rotten and unsightly potatoes from the top of your load? In the spring when your hams, shoulders and sides begin to show the presence of skippers, don't you hustle them off to your grocer rubbing the affected places to cover the defects? Don't you sometimes mix poor butter with good to try to get a better price for the poor? Haven't you often tried to palm off a lumpy-jawed steer, a spavined horse or a curbed colt as sound animals? Don't it seem natural to pick out the best specimens for topping off packages of apples, strawberries, and in fact all kinds of fruit? These may not seem very serious faults, but, gentlemen, they are partly to blame for the present degraded condition of the fruit trade.

I think you will admit with me that this matter is of sufficient importance to demand some attention, so I would like to suggest a few methods by which I believe the evil can be considerably lessened.

First: Raise the best fruit. By careful selection develop varieties which will yield a first-class product. There will then be no cause for "facing," or mixing poor with good kinds. Second: Cultivate and fertilize properly and the yield will be large. Desire for "shaving", using false bottoms and smaller packages will be lessened. Third: Pick before the fruit gets too ripe, which will enable you to get it to market in good shape, and this will avoid the necessity of commission men repacking and having an opportunity of being dishonest. In

other words, by being thoroughly upright yourself, you will in a measure compel others to be so.

Now you all know that Illinois has come to be a great fruit-growing State. This was splendidly demonstrated last summer at the fair. The industry is represented by millions of dollars' worth of product each year; and yet little attention has been given it by our legislators, so far as encouraging or protecting it is concerned. Upon a careful examination of all the laws of Illinois, I find that the following are the only ones which, in any way, bear upon the fruit industry:

First: Every farmer or fruit grower shall have the right to sell his produce anywhere in spite of any city or other license, laws or prohibitions. Second: Whoever shall enter the enclosure of any person without leave of the owner and pick, destroy or carry away any part or portion of any apple, pear, peach, plum or other fruit tree or bush or vine, shall be fined not to exceed $100. Third: Anyone who shall sell, or offer, or expose for sale, as cider vinegar, not the legitimate product of the apple or pure apple-juice known as apple cider, shall be fined from $25 to $50. These are all the laws that touch directly upon Horticulture in any of its branches. A similar condition of affairs exists in other States. New York has, or at least did have, a short time ago, laws requiring apples to be packed and sold in standard-sized barrels. Why would it not be wise to advocate some such legislation here extending it to cover all fruits. For example, make it a punishable offense to sell apples in barrels which are not flour barrel size, with eighteen-inch heads and holding three bushels; or sell peaches, apples, potatoes, etc., in one-third bushel boxes. Peaches, pears, plums, and the like, could also be put up in one-sixth bushel packages. Have the boxes for cherries all one size, and a similar regulation in regard to strawberries, raspberries, blackberries, currants, gooseberries, etc. Make it also a punishable offense to sell packages with good fruit on top and poor beneath or in the middle. To prevent false returns, to a certain extent at least, compel commission men to submit their books to the inspection of their customers, should they desire to look them over.

To render these laws most efficient it will be necessary for them to be enacted in all the principal fruit-growing States; for, if in operation in one locality only, they would have but little, if any, beneficial effect upon the fruit industry as a whole.

Long before I have reached this point I fancy I can hear you saying to yourselves, "That is all visionary, it cannot be accomplished." I am not so sure of this. Again, going outside of horticultural lines for an illustration, I would ask you to look at the New National Dairy Union formed in January, and note its methods. Its purpose is to protect the dairy industry by compelling the manufacturers of butter substitutes to sell their products for what they are, or to go out of the business. The union has gone to work systematically, and through State

and local dairy associations, it is appointing committees whose duty it is to induce the patrons of the creameries and dairies to vote for State legislators who are willing to originate and pass laws which will tend to suppress fraud and dishonesty in dairying.

Could not a similar plan be adopted by Horticulturists? They are, as a rule, much better organized than dairymen, for they have already international, national, state, district and county societies, well established and in good working order. By working through these it seems that men could be elected who would willingly aid in placing the Horticultural industry on an honorable basis, which would make it possible for a buyer to purchase a basket of fruit without feeling that, ten chances to one, he will be swindled. True, the trade has not been as seriously menaced as has dairying, but, as new varieties which flourish in colder climates are produced, and as the immense orchards of southern Illinois, Missouri and other localities, come into bearing, competition will become greater and greater, and anything which now injures the sale of fruit will then be ten times more disastrous.

DISCUSSION.

Probably no point in any paper received a more hearty endorsement by the convention than that made by Mr. Shamel against dishonest fruit packages, etc.

The propriety of regulating the size of fruit packages was discussed somewhat at length and brought out the following resolution which was presented by the secretary and adopted by the society.

WHEREAS, The variation in the sizes of fruit packages is so generally misleading to the purchaser and so harmful to the fruit-growing interest in general, that we deem it worthy our attention, therefore be it

Resolved, That it is the sentiment of this convention to ask of our next legislature the enactment of such laws as will regulate the size of fruit packages.

CURRANTS AND GOOSEBERRIES.

PHIL. STRUBLER, NAPERVILLE.

Mr. President:

Three or four years ago I wrote a paper on "Gooseberries and Currants," wherein I stated I would first of all plant Champion, next Downing, etc. The experience of the wet summer of 1892 has changed my mind so that I now say plant Downing first, Houghton next, and Champion last. The Downing, all things considered, is the best gooseberry to plant for profit that I am acquainted with. It will stand more cold, heat, drouth and wet, and bear a bigger crop of fruit than any gooseberry that I know of.

The Houghton is the old stand-by and is an enormous bearer of medium sized fruit. It is too small to bring a good price compared with the Downing or Champion. Champion is about the size of Downing, but a much earlier bearer and has no doubt some English blood in it, as it will not stand excessive wet weather on account of it dropping its leaves, though it originated in Oregon and is claimed to be a genuine American seedling.

About eight or ten years ago I sent to England for 600 of their choicest gooseberries, five to ten of a kind. They were planted in good soil and had the best of care, but to-day there are no more than about fifty of them alive; they have all been consigned to the brush heap. There is no use of trying to grow foreign gooseberries in this country, for the reason they wont grow and if they do grow it is but a feeble existence without bearing any fruit.

Seedlings grown from the fruit of imported stock are no better. Don't get fooled with them.

Of all the foreign gooseberries that I have tried I find that the Whitesmith is the only one worth growing in this country, and I would not advise growing them on a very large scale, as they are liable to mildew and leaf blight, but bear fine fruit where the atmospheric conditions are right.

The Puyallup Mammoth is the finest and largest gooseberry I ever saw. They grow to the size of Green Gage plums; they are of mammoth proportions and enormous bearers. Though it is said it originated in Washington in the shadows of Mt. Tacoma, in an old deserted Indian camp near the Puyallup river, I am satisfied it has some foreign blood in its makeup. This berry has brought as high as $5 to $6 per bushel in the Chicago market. Could this berry be grown on as strong a bush as the Downing or Houghton that would withstand our variable climate as they do, I could see a fortune in it.

Smith's Improved is also a fine large berry. It is classed as an American seedling, but the wet season of 1892 proves conclusively, without a doubt, that it is of foreign origin. Aside from this it is a very shy bearer and not quite hardy here. With me it is no good. Would not plant it for fruit for market under any circumstances.

Industry, a splendid large English variety of quite recent introduction is also no good here. It leaf blights and mildews badly. If grown on the north side of a high board fence or building, where it is partially shaded, it bears fine fruit.

Yellow Orange. A yellow variety about the size of the Houghton is the earliest gooseberry that I have grown. The only fault with it is it suckers too much when grown on too rich soil, and runs to wood instead of fruit; grown on land not too rich it is a fine bearer of nice yellow fruit. It has never mildewed with me.

I find gooseberries and currants planted five feet each way to give by far the best satisfaction, especially strong growing kinds,

such as the Downing and Houghton, Victoria and Long Bunch Holland currants. Planted in this way they should of course be cultivated both ways, which gives plenty of room, air and light. I find they do much better this distance than when planted closer together.

I usually plant two-year-old plants, but find that one-year-old, when strong, are just as good. I regard fall planting the best time by far for the planting of gooseberries and currants, especially when planted in September and the first half of October. When planted at this time they get partially established before cold weather and make a good growth the following spring.

The first two years after setting a plantation there is not much need of pruning; after that prune enough to admit light and air. The more pruning the better and larger the fruit will be. Currants need not as much pruning as the gooseberries, but well pruned and open heads are as beneficial to the currant as it is to the gooseberry.

Never plant currants that are liable to the blight or mildew of the leaf. To avoid this be sure to plant first, Victoria, Long Bunch Holland and, last, Prince Albert. There may be others that I have had no experience in. The above mentioned varieties are all late and good annual bearers, with the appearance of the fruit in favor of the Victoria. Long Bunch Holland and Prince Albert are erect, compact growers, of rather light colored fruit. Bush of Victoria grows more open, fruit of a nice bright cherry color. Neither of them sprout from the roots but from the stem of the original plant, which is much in their favor. They are scarcely ever attacked by the currant borer, which is another point in their favor.

The Fay's currant as grown by me is twice as large as any other currant I ever saw. Were it not for its too much suckering and the leaf blight, it certainly would be the finest currant in existence. The wet season of 1892 proved to me that it is not a safe currant to grow on a large scale. They dropped their leaves so bad, that the following year, 1893, one-half of them were dead to the ground.

Currants and gooseberries should be cultivated at least once a week from early spring, or as soon as the ground is in working condition, until frost in the fall. They will stand any amount of feeding with barnyard manure. Don't be afraid to put on too much, the more the better and finer the fruit. I find rye straw that has been used for bedding stock hauled direct from the stable the best mulch of any, as it contains no seeds of noxious weeds of any kind. The cultivation of the gooseberry and currant are identical. The treatmemt of one will apply to the other.

DISCUSSION.

The experience of Mr. Strubler with English varieties of gooseberries was practically the same as those who took part in the discussion of his paper.

Spray with Hellebore, London purple or Paris green in solution for currant worm.

WOMEN AS GARDENERS.

MRS. ELLEN BRYANT FREEMAN, PRINCETON.

Mr. President:

The labor problem is the great and absorbing question of the times, a question some phase of which more or less interests all classes. The employer's chief interest seems to be to get his work done for as little money as possible; the workman's to labor as few hours as possible for his money. While each of these seems intent only upon his own selfish ends, we can feel but little sympathy for their difficulties, knowing as we do that nothing but the golden rule, put in practice, can remove them. It is the great army of the unemployed and those working for starvation wages that excite our compassion; those who, anxious to work, are really unable to find employment which is, at the same time, adequate for support and within their ability to perform. When we look about us and see so many busy, overtaxed people whose every working hour is filled to the brim with what seems to be necessary or important duties, while countless things which ought to be done, but are not, are constantly crowding upon them, it seems difficult to believe that there is not work enough of some kind in this world of ours for all who wish to labor. That there is not always remunerative work may be because the work that needs doing and the needy worker are not brought together. So it is that we hear of half-famished seamstresses working fourteen hours a day for the merest pittance; shop girls kept standing till ready to drop from exhaustion; and all because these avocations are overcrowded. Anything which tends to equalize or bring together supply and demand should be a welcome suggestion.

In these days when women are undertaking so many avocations which were formerly pursued only by men—when, in fact, there is scarcely any profession or employment which women have not attempted with more or less success—the question arises, why is not gardening in its different branches a suitable occupation for women who must labor with brain or hands for their own bread and butter, or even for those who, not entirely dependent upon their own exertions, would like to add something to their income? Or, in other

words, having the bread and butter furnished them, would like it occasionally spread with honey. I feel sure that, in suggesting this idea, I shall meet with no opposition, run athwart no masculine prejudice. I have observed that men seldom oppose women when they wish to engage in the more laborious occupations. It is only when they aim at the higher professions, aspire to political office, or reach forth their hands to grasp the emolument, or take part in the management of affairs of state, that the cry is heard, "Keep to your home duties and your proper sphere." It is from the other side that I should expect opposition—from those who shrink from soiling their hands; who fear to tan their cheeks or drabble their skirts. Perhaps I may as well here confess to a most unfeminine love for digging in the dirt. Whether it is a heritage from a long line of agricultural and horticultural ancestors, or whether from an innate perversity and longing for independence, I cannot tell; but one of my earliest aspirations was for a hoe of my own, to use and lose and allow to get rusty just as I pleased. So it will be seen I am not unbiased.

I have great faith in the coming of that golden age in which Miss Willard predicts, when "tool-workers shall take rank with other bread-winners," and that, in that better time, the young woman who works in the kitchen, and the young man who follows the plow will be as well received in good society, at least, as they who stand behind the desk and the counter. Is the objection raised that women have not the physical strength to perform outdoor labor; that these occupations are too severe for them? Does any one suppose that it requires more strength and endurance to cultivate the soil with the labor-saving implements now in use, out in the fresh air and life giving sunshine, than it does to stand all day over the wash tub, or ironing table, in a hot, steaming, stifling atmosphere? Let us be magnanimous for once, and leave laundry work to the men; they are taking it anyhow, and making it more profitable than women have ever done,and if we must work hard let us do something that shall not only develop our muscle, but steady our nerves, vitalize our blood and give us sounder health, more buoyant spirits. It cannot be harder for a woman to stoop and pull tiny weeds from long rows of beets or onions than it is to bend all day over a sewing machine making overalls at 25 cents per dozen, or linen collars at 12 cents. The money earned could scarcely be less, while the vegetable weeder would have one thing in addition to her wages which the sewing girl has not, cannot have; something which the most penurious and exacting employer could not deny her—pure air to breathe.

Suppose some of the sewing women who crowd into the cities to do shop work at such unremunerative prices could be induced to take employment from florists, market gardners, or fruit growers, bringing their womanly tact, taste and skill to the preparing of products for

market in the neatest, wholesomest,most attractive and salable manner. Certainly the women so employed would be gainers from the more healthful occupation, thus enabling them to better bear the strain of their former life, if they must return to it in the winter months; and would it not have a tendency to increase the price of the sewing woman's work by lessening the number of applicants for it? Suppose some of the daughters, who, having been educated by their parents, are anxious to relieve them of the burden of their support, should engage in some such occupation instead of pushing into the over-crowded ranks of teachers, not over-crowded with good teachers, but with those who teach "for revenue only" and have no special fitness for the work. The money earned might be less, I grant. We should be willing to pay more for the culture of our children's minds than for the cultivation of the soil; and we ought to be a little more careful to employ competent cultivators. But the nervous strain of teaching wears out and breaks down many a young woman, who might have stored up vitality and power of endurance which would have been of untold value to her in future years; while who can estimate what the school children might have escaped.

Suppose, again, that our seed merchants, who do such an extensive business, should entrust to women, who are the possessors of some portion of Mother Earth, and wish to earn money, the raising of special varieties of choice seeds that must be grown in isolated places; here again woman's carefulness, accuracy and attention to details would make her especially fitted to the requirements of the business, and her physique would be the gainer.

If, in all of these supposed cases, the proprietors could be women also, understanding as only woman can the needs, peculiarities and limitations of her employes, would not these women find a congenial, healthful and remunerative occupation without invading any of the rights of the sterner sex, or being in any danger of adding to the tramping fraternity? Or, even if they were thus taking places which men might otherwise occupy, equal rights are soon to be the spirit and watchword of the age, and the most skilled and faithful workers, whether men or women, will secure the best positions.

Money is not the only thing worth working for. The employment that undermines the health, no matter how large the wages, is not profitable. We hear a great deal said about the need of physical development in woman. Let her look to this, for there lies her hope for the future. Year by year she is demonstrating her equality with man in mental power, executive ability and business capacity. She must be his equal in perfection of physique. Why should she not hope to find in the garden the vigor and independence which, according to the old legend, she first lost in a garden? If she there

learned to know good and evil, why should she not there put in practice her knowledge? She was driven forth, so the story says, ere she could partake of the fruit of the tree of life. Let her search for that tree and never tire till she has eaten of its wonderful fruit and regained the perfect health, which is her birthright. I am sure it grows not under any roof nor within any four walls.

So much for the possible profits of gardening for women. I fancy we are very sure to find pleasure in whatever proves to be profitable to us, but sometimes pleasure is the primary object, and a love for the products of the garden, be they those which please the eye or the palate, is the incentive. With a goodly array of those gorgeous picture books known as seed and plant catalogues, so plentifully distributed over the land, the amateur gardener, during the long winter evenings, lays her plans and fills out her orders. What enchanting visions of luxuriant plants and beautiful flowers fill her mind as she turns those alluring pages! Or, if she be vegetably inclined, how her mouth waters in anticipation as she reads the description and admires the cuts of the mammoth tomatoes, wonderful cabbages, prolific peas and beans! Or, if fruit be her heart's desire, how fascinating the thought of the ever-bearing strawberry, the ever green blackberry and the Japanese wineberry. Fancy pictures in glowing colors the garden she is going to have, and as she adds to her list a few more tempting novelties and wonderful new varieties, she is ready to pronounce gardening a most charming occupation, in February and March. She finds it a pleasure, too, in the spring months when, after the shut-in season, the mild air and bright sunshine make it a delight merely to be out of doors; the mellow soil has been turned and pulverized and laid out in trim, orderly beds or regular rows, and the young plants open fresh and green and beautiful with such encouragement for the future. Yes, gardening is pleasant in April and May. How is it in July and August, when intense heat makes any exertion a thing to be dreaded; when drenching showers and scorching suns have kept her in doors till weeds have swamped and outtopped her treasured plants, and insect enemies of every description have ravaged them? Emerson, in despair over a situation of this kind, sententiously exclaimed, "No land is bad, but land is worse;" and the gardener who can be thorough and enthusiastic in her work, with the mercury at 90° in the shade, can regard with equanimity the ravages of storms and of insects and the neighbor's fowls, and never feel like exclaiming, no garden is bad, but garden is infinitely worse, must be a real enthusiast indeed in her work.

Some roses do bloom in perfection of beauty in spite of slugs. Now and then a cabbage escapes the destroying worm, and gardening

goes on with great success, even with all the enemies and difficulties, and those who engage in it for the love of it find their reward in many ways.

You who have made your first attempt at gardening for pleasure, are you discouraged? And do you imagine you will never try again? You certainly will; the spell is upon you; you will never resist it; the fairies that nestle in the heart of the rose and the golden cup of the nasturtium have you in their power; the pansies have looked up to you with grateful bewitching faces; the sweet peas have waved their banners and clasped their tendrils about you. You have listened to the chimes of the lily bells, and drank the nectar from the tinted cup of many a fragrant blossom and are forever subject to their enchantments. You have aided nature in her labors and she has not only disclosed to you some of her choicest secrets, but, like the true, great-hearted mother she is, she has rewarded you a hundred fold. She has whispered to you in her breezes, and sung to you from her tree-tops; she has fed you upon her elixir of life and healed you with her invigorating balm; she has soothed and cheered and rested you.

"For your gayer hours,
She has had a voice of gladness and a smile
And eloquence of beauty, and she has glided
Into your darker musings with a mild
And healing sympathy that stole away
Their sharpness ere you were aware."

You will never lose your love for her, she has given you pleasure of the purest kind; was there not also profit? In balancing your accounts with her, do you set down upon the side of loss sunburned cheeks and roughened hands; then balance them with your good digestion, freedom from nervousness, sound sleep? Has there been toil and disappointment? There has also been, to balance, enjoyment and success. Life is full of dreary places. Have you brightened any of them? Have you brought into the heart of any of this world's sad and weary ones a moment's cheer? Have you gladdened childhood with sweet flowers or enlivened the sick room with freshness and beauty? Have you made a tiny spot of earth fruitful or lovely where else all would have been barrenness and disorder? Have you added in the smallest degree to the earth's products of use and beauty? Set these down on the profit side, and let thankfulness and pleasure well up in your heart that you have added even a little to the common good. Brightness and beauty and cheer are not too common. We cannot afford to undervalue anything which adds to them. I think I am safe in saying that she who engages in gardening for profit may find in it great pleasure also. Whoever seeks in it pleasure can scarcely fail to find that it profits her greatly in many ways.

OUR NATIVE FLORA.

EDGAR SANDERS, CHICAGO.

Mr. President:

The native flora of this country has been much neglected by us, and many of our garden flowers, like the beautiful family of hardy Phloxes, had first to be exported and the flowers improved by Europeans and then re-imported before they were thought much of. This improvement of wild flowers was an interesting one, and there is no doubt but many still remain undeveloped which, with care, could easily be so changed as to be even better, as hardy garden plants, than many far-fetched and highly-extolled kinds that are catalogued. By these botanical rambles much good might therefore come in becoming acquainted with the flora of one's own locality, and a selection made of kinds to improve by garden culture and the production of new varieties. "Women as Gardeners" also opened up a subject that was interesting and one that, in this flower-loving age, was already furnishing lots of employment for women, in stores at least, as well as the ownership of greenhouses where plants are grown and stores where flowers are sold. The speaker however warned all who might wish to enter it, that a good deal of work connected with gardening was not quite so rosy as the pleasanter part might lead one to fancy, and that the field work of the digger and delver of gardening had long in some countries, and indeed for that matter, in some of the truck gardens of this country, been the occupation of women, but one would scarcely care to recommend that part at least as of a very elevating nature, or one likely to be attractive to our youth. So far as working among flowers is concerned, women seem peculiarly adapted for the purpose, and their employment would likely increase.

REPORT ON PRESIDENT'S ADDRESS.

Your committee, to whom was referred the President's Address, would respectfully report: In reference to the exhibition of fruit made by the State Board of Horticulture at the Columbian Exposition, we think we voice the sentiment of this society and of the people of the State of Illinois, when we pronounce it a credit to the State and to the Horticultural Societies of the State, and vindicated by the awards received. We endorse the sentiment of the President in thanking the legislature for the appropriation which enabled us to make this exhibit.

We further endorse the ideas in general of our honored President in reference to the present condition and the future promise of our apple orchards, but are inclined to demur from the opinion of what some one has said "that the time will come when the orchards of north-

western Iowa will rival in profitableness those of California" as being entirely Utopian.

The suggestion that Arbor day be observed is especially commended as inspiring in the young a love of nature and a personal interest in the planting and care of trees and shrubs.

We also endorse the sentiment in the address that "our best efforts and intelligence should be directed to the final development of progressive Horticulture." We desire to commend the address, as a whole, as being brief, concise and to the point, and trust that all may carefully study the suggestions made therein and profit thereby, all of which is respectfully submitted.

URIAH PERSONS,
L. R. BRYANT,
C. U. GEETING,
} *Committee.*

INFLUENCE OF HORTICULTURE ON CIVILIZATION.

*ELMER BALDWIN, FARM RIDGE.

Mr. President:

Man has by nature a susceptible and receptive faculty strongly influenced by his business, his belief, his diet and associations, social, moral, esthetic and religious. Primitive man, living the life of a hunter, deriving his food from killing and slaughter, was also a warrior, accustomed to killing of animals; he had little feeling for his fellowman, and, of all the animal creation, the only one that met in bloody strife their own species, and destroyed each other by brutal, wholesale slaughter. Through all the historic and traditional period war has been the dominant employment of man. The most praised, honored and greatest heroes in human estimation were the leaders in the most cruel, devastating and bloody wars, whose real merit should have consigned them to eternal execration and infamy.

Alexander, Xerxes, Cæsar, Tamerlane and hosts of others prosecuted wars which depopulated nations; were waged without cause (or pretended offense from the suffering nation), but solely from personal ambition and innate cruelty and savagery. Savage tribes were ever at war. The American Indians were but few in number, scattered over an immense territory, yet always at war, were exerting every energy to make the number less. Nor was this cruelty confined to the leaders of earth's devastating hosts; it pervaded the mass, and they were the willing instruments of those fiends incarnate.

Nor was the mission of the Prince of Peace able for centuries to change the universal love for sacrifice of human life. Unceasing war, the crusades and religious frenzy all tended to human destruc-

*Died November, 1894, at the age of 85 years.

tion. For centuries the smoke from the martyrs' funeral pyres never ceased to rise over some part of Christian Europe.

Man's better nature seems to have been poisoned by his surroundings and his habits. The age of chivalry was but a faint glimmering of a brighter promise; while aiming to protect the weak and defenseless it was still done by the sword, the strongest arm the only arbiter, and personal combat the only adjudicator. Yet there was in human nature a kindly sentiment, a regard for human welfare and a disgust with the cruelty that dominated the world. This sentiment required but proper culture, favorable surroundings for a progressive development.

This tendency to an improved humanity was first developed where since has been his native home, among the sylvan scenes of nature—the lofty tree, graceful foliage, beauteous flower and luscious golden fruit. A regard and love for these, with such surroundings, has ever softened, refined, polished and transformed the man. The deities of Ancient Greece were supposed to descend from high Olympus to hold a conclave for deciding the fate of nations in the sacred groves, in nature's serenest, loveliest scenes, and scenes that pleased the gods were supposed to rear the best of men.

Eden's rural beauteous scenes were rich in all that refines human character, whether regarded from the strict orthodox view of stern reality or the more liberal claim as typifying a perfected human condition given by the wise men of a long past age—in either view it comes to us as a grand enunciation of a great and grand truth, holding in its grasp the hopes and destiny of humanity. The physical perfection, health, enjoyment, refinement, virtue and purity of man cluster around and among the bowers of Eden, and through all the ages man has progressed, has emerged from the cruelty and crime so rife, only as he has approximated that standard. When Rome developed a civilization that showed in contrast with her conquering, destroying armies, she derived it from classic Greece, whose mild climate and fertile valleys were supposed to tempt the gods to aid in the culture of seeds and plants, and who deputed Ceres and Pomona to preside over the richest treasures conferred on man.

When Rome stamped out the liberties and arts of Greece, her legions brought back the sacred knowledge there learned and planted it on the Campagna, the garden spot of Italy, where was developed rural art and rural taste, and with it a civilization before unknown. This flourished under the consuls, but waned under the tyranny of the empire. Rome's greatest statesmen delighted and gloried in rural life. The Campagna was a garden.

When Cincinnatus was chosen consul to preside at Rome and command her armies he looked back with a sigh and said: "I fear my little farm will this year go uncultivated." Expressive of the

truth that the culture of nature's priceless treasures is more honorable, valuable and satisfying than the command of slaughtering armies. Virgil has embalmed Roman rural art in classic verse. But Rome fell beneath the northern hordes, and her halls, her works of art, her groves, gardens, orchards and vineyards were crushed by the heel of the savage, and for more than a thousand years their recovery was slow and tedious. The monasteries and religious houses helped to preserve the art and form a nucleus for future growth.

Modern Horticulture has quietly, silently been working its way in the elevation of humanity; the renovation of public taste, of law, of ethics and public virtue, as effect follows cause; such must be the result, living on nature's purest, most healthful food; living among and cultivating nature's choicest, fairest, noblest beauties, breathing the purest air, depending on heaven for all his wages, he can but be influenced by his surroundings, and be a better, purer, nobler being than those of the past who have lived at the slaughter pen, and whose business was to slaughter men. That quiet, serene, purifying process is being felt through all the nation.

There is a growing sentiment that war should cease; that national and international questions have an easier solution; that Europe should disband her armies, and her millions of soldiers beat their swords to plowshares, to pruning hooks, and rear the grains and fruits for a healthful, refining dietary; that the lion and lamb should live in peace, and war's dread clarion no more be heard. This quiet, peaceful influence is yet most powerful; it brooks no opposition; war's rude tumults and monarchs despotic rule will fall before it. It abandons the long-used plan of opposing force to force, and making the world a perpetual scene of brutal contest. Instead of fighting the brutal man it changes, lessens his brutality, leads him along quiet, meandering streams, through luxuriant meads rich in in flowering herbage, fragrant with the wild flowers' richest aroma. Teach him to rear, to train, to prune the apple, the peach, the plum, the berry that shall drop their mellow fruit ready fattened for his use, and wander on the vineclad hillside loaded with the purple clusters—make them his food, and through another wooded island such as graced the Columbian Exposition, and that modicum of true and refined humanity that lurks in every human bosom will be at least awakened and enlarged, and his brutality correspondingly diminished. When that experience is dispensed to all the people, when they shall live on the grains and fruits assigned for use in Eden's stern decree, a purer and better humanity will bless the world.

There exists in every human bosom an innate sense of the beautiful in nature. It is confined to no class, to no condition, but is found wherever humanity exists, and it is only brutal surroundings and example that throttle and destroy it. The humblest cottage adorned

with nature's simple rural arts is more pleasing to the beholder than the most costly mansion naked of nature's richest adornments. That cottage may have but a single shade that wards the noon day sun; its branches singing with the evening zephrys soothe the inmates to restful sleep. A bed of pansies bloom by the narrow path, a single rose and astor's bloom tell you there lives a soul appreciative of nature's beauties, a bit of nature that under favorable conditions might reach colossal proportions. There is the true agrarian leveler. Those pansies bloom as bright, that rose sheds as rich a fragrance as those that deck the wealthiest mansion in pots of gold. With healthful toil and simple fare those humble votaries at nature's shrine sleep sweeter, rise more refreshed and enjoy more of life than many of a luxurious home.

The contest long waged by simple nature's promptings in the struggle for Eden's ideal against the wrongs of a perverted world has accomplished much; many of the grossest practices have yielded and others are modified. Rural virtue makes a bold stand against city vice, and rural art, the art that improves nature, is making steady progress, but much remains.

The horticulturist among his fruits and plants must read the details of a brutal prize fight with supreme disgust, and estimate the effect of the thousands of saloons that poison the current of life in Chicago and a corresponding number in most of our cities and villages, with equal sorrow. It is said the pugilists only hurt each other, bnt they do brutalize the world; the saloons have no redeeming trait.

It has been a mooted question as to what was the forbidden fruit in the garden. It was not the literal fruit, for those were all given for food and pronounced good, but a knowledge of good and evil; this gives the only clue—the world's subsequent history in view of that remark may explain it. The fruit was, has ever been, and is good; all good; good for health, for enjoyment, refining, ennobling; but perverted its juice fermented, transformed to alcohol was, has ever been, and is evil; all evil; debasing, demoralizing, destructive. Nowhere else in nature are extreme good and evil so close in origin, in juxtaposition, and so extreme in their opposing influences as those; it is well named knowledge of good and evil.

If it was from the perversion of nature's purest, richest blessings, the greatest evil of the world was produced, paradise must be regained by a right use of these. The world is moving in that direction with the rural population in the lead. While there are crowds in the cities ready and anxious to join in the reform for the improvement of the world they are measurably handicapped by the hordes of vicious men blocking their way. The rural element has less impediment; their influence and surroundings are all favorable and it becomes them to utilize, as faithful stewards, the grand opportunity they possess; with them must be the staying element of

reform. In enumerating the responsibilities we necessarily and sometimes unconsciously assume, along the pathway of life, there are many secondary in effect and consequently less noticed, but in their resulting effects involve equal responsibility.

You join in the sport of the race course; perhaps thoughtlessly and unintentionally lend your influence to pool selling and the worst of gambling hells. Our statute law, with a strange inconsistency, forbids gambling, by strongest penalties, excepting on the race track, where it has full liberty—a political tub thrown to the gambling whale.

The pretty little wing of a bird on a lady's bonnet—result of a thoughtless fashion—she buys of her milliner, she of the dealer in the city, and he by contract with the half-civilized hunter that depopulates the tropical forests of their bird population. Large tracts of those forests, once vocal with the songs of those innocents and alive with the flutter of their plumage, are now vacant and silent; those happy denizens of nature's wilds exterminated by the ladies that wore their stolen plumage—result of a thoughtless, cruel fashion and small benefit for so much cruelty and devastation. Many like examples might be named showing the covert temptation that beset life's pathway and the influence of life's surroundings. The refining influence of rural art has ever been conspicuous. There were no slaughter houses in Eden, or carnivorous animals to live on blood and rapine.

In all the world's savage, cruel annals, where in some quiet, secluded nook Horticulture has found votaries, man's better nature, more genial feeling, more kindness for his fellowman and all animal existence has shone like a beacon light among the surrounding gloom. The quiet, secluded valleys of Ancient Greece, the favorite resort of the heathen deities, the Roman Campagna, the vineclad glens of the Swiss Alps, the little gardens of the monasteries sheltered and protected during the dark ages by the fear and respect for the church, each for the time shed a halo of purity and peace around their precincts.

Since universal war and rapine has so far ceased as to permit a reasonable protection to the arts of peace, this art of arts has claimed first recognition. It has grown with the intelligence, morals and virtue of the people. Aided and stimulated by those conditions itself it reacts, stimulating and intensifying those conditions. The pastoral succeeded the hunter and the savage, but still wandering with no fixed habitation, and consequently no permanent improvement of any locality. When man became an agriculturist, of necessity the land he cultivated became his home, and he soon learned to dress and beautify it. Agriculture adorned with its higher art is the base of all fixed habitation and business. The shepherd with

his flocks and herds roams in search of better pasture, and the caravan, the conduit of the rude commerce of pastoral man. The cowboys of our western ranches are in some degree representative of pastoral refinement, while the fixed residence, permanent improvement, abundant food, sober industry, frugality, health and independence marks the higher status of the agriculturalist, a needed foundation for the higher status of Horticulture.

Agriculture may be regarded as the sober prose and Horticulture as the poetry of rural life. Both spring from a higher development of the primitive man. The most cursory and transient view of any locality fixes in the mind of the observer the esthetic taste and progress of its people, and all from the horticultural exhibit displayed. Architectural beauty is stately and grand but costly and confined to the wealthy, but is tame and naked unless embellished with nature's magic charm. Literary culture, higher education, is to a certain extent confined in its scope; and yet the horticultural devotee reaches a higher education, a higher culture through the practical processes of his art. Chemistry, botany, entomology, in fact all the natural sciences, are to a good extent practically learned in his daily routine, living with, dealing with nature's secret forces, inspired by her choicest beauties in the grand sucession of seed, plant, flower and fruit. Aided by the profuse, perfected and cheap science and literature in the public press brought to his aid, he can demonstrate the important fact that all knowledge does not come from a college curriculum nor all science reside in an A.B's parchment. He does not depreciate the value of college lore, but asks, in all fairness, that it be made accessible to all; that the heavy expenses that now fence in the fountain of knowledge be removed and college extension such a reality that a four year's course of transplantation to vicious luxuries, with a yearly expense of one to two thousand dollars shall not be necessary for acquiring all the science practically necessary for the use of an intelligent and practical man; that enfeebled health and vicious habits will far outweigh all or any excess over and above what many more safely be acquired in the safer precincts of home, not that he loves learning less, but health and virtue more. But neither need be sacrificed. The future, instead of gathering the few favored ones in the gilded halls of learning, will scatter the college professors broadcast over the land to dispense the same knowledge in a more practical way. Perfected Horticulture will prepare the world for the success of college extension. The city and its population is destined to be reformed. The close, disease and vice producing system of building, shutting out pure air and all of nature and nature's beauty, must yield to a better philosophy.

Brigham Young laid out Salt Lake City on a plan that should be copied where civilization goes, very wide streets, and each resi-

dent lot contained 1¼ acres, sufficient for a vegetable and fruit garden where each could revel in the luxuries of nature's richest products. Such expansion of our cities, in view of modern facilities for rapid transit, would occasion but slight inconvenience far overbalanced by the pleasures and beauties of rural surroundings, a chance for healthful toil, in proximity near enough to stimulate competition in beautifying their premises, and for healthful social intercourse; a radical contrast with the confinement of continuous brick walls, the earth and its absorbing healthful influence shut in by barren pavements, the pure air but partially admitted and nature's sylvan beauty wholly excluded—a condition but slightly removed from that of the cities of the Middle Ages when the plague and other fatal diseases swept them with destructive fatality. The narrow alleys, crowded dwellings, slums, and crime and disease producing precincts of filth and squallor should be rooted out and scattered over the world's broad domain—with a spot of God's free earth, an inherent right, for each that lives. You can't separate those city slums from the body politic; they are a component part of the whole, and the vice and disease there engendered sweep like a simoom over the world, like cholera from the slums of Asia. Business pursuits may demand a portion of each day in the marts of commerce, the factory and mechanical labor, but the home, the living, the vital functions, must be sustained, recuperated by sleep, rest and recreation, in the pure air of the country among the bowers of nature's vegetable growth and purification. This is the Mecca toward which the pure and virtuous gravitate and where they grow wiser and better.

Modern city life, by a common consent, admits and practices on the truths I have attempted to enunciate. The millionaire leaves his gilded mansion in the aristocratic purlieus of the city to enjoy real life in the country cottage surrounded by the purer scenes of nature's own, and all denizens of the city able to bear the expense hie away, with a common impulse, to recuperate among the fields, gardens and orchards of the country. The higher the civilization the more refined and intelligent the people, the stronger the impulse to leave the foul ills that cluster around city life for a slight taste of the lost Eden.

These facts are a forcible object lesson for the country boys and girls who are restlessly thirsting for city life; it should teach them to appreciate the best condition that blesses humanity. Seeking for fortune in the city is an uncertain and precarious adventure; a very small percentage succeed and a very large percentage worse than fail. It is said, a high order of civilization seeks the pursuits of rural life, and that intelligent rural life rears a high civilization; both are true as proved by experience.

There are wildlings among men as well as fruits. When the Cobden fruit district in Illinois was first discovered as such, the new settlers that occupied it were all horticulturists, and went there to engage in fruit culture. The contrast between them and the old occupants of the region was very marked. The former occupants cultivated no fruit, the wildings were ample for them, and they held in deep derision all improved varieties. Their intelligence is shown by the character of their public school. Their teacher had been a fixture for several years, was held in high estimation, and was perfectly satisfactory to his employers. He told some of the new comers, who visited his school, that he was no scribe. He could not write his own name, and taught only reading and spelling. Most of those canaanites were bought out by the new comers. A few of the more intelligent remained and soon became imbued with the spirit of their surroundings. The Cobden community is the peer of any other, and, for universal intelligence and refinement, the superior of any I ever met—a bright and shining light in what was once a surrounding darkness, very appropriately called Egypt. But the development of Egypt as a fruit region is transforming its sombre condition into the garden of this western valley, and what is true of Egypt may be said of all the west; its fertile soil, genial climate, just severe enough to stimulate industry, its energetic people, mark it par excellence—the home of refinement and rural art. Each State has one or more Horticultural Societies aided by the State, and a deep interest in the subject is growing and expanding, and its spirit is far in advance of the east. The moral, intellectual, and esthetic character of the northwest is in keeping with its rural taste and culture, although but an earnest of its future excellence. A schoolhouse within reach of every child, a high school in every village, and doubtless soon to be in every country town; the universal and cheap dissemination of current news and literature, nearly all developed within the life of many now living, is a result never before accomplished by any people. It is true the world is all progressing, and we are propelled by the general current, but our craft outsails them all. The genius of freedom, first displayed on the western continent here untrammeled by the traditions and superstitions of an effete and rotten aristocracy, is expanding with a force elsewhere unknown. The dependent class are all cared for, and human suffering meets with kindly sympathy on every hand.

REPORT OF COMMITTEE ON FINAL RESOLUTIONS.

WHEREAS, It has pleased the Horticultural Society of Northern Illinois to meet in annual session in the city of Princeton, and that we have received much benefit from such meeting, and that we deem it proper to make appreciative acknowledgment, be it therefore

Resolved, That our thanks be tendered to Col. I. H. Elliott for the able and appreciative address of welcome on behalf of the citizens; that we appreciate the able Address of our President, and commend it to the society; that the American Hotel deserves special mention for its extended hospitality to our visitors and members; that the quartet has our thanks and good will for the appropriate music furnished. That we extend our heartfelt gratitude and appreciation to the citizens of Princeton, for the cordial welcome and social entertainment we have received at their hands; that we desire to extend to N. P. Colberg our hearty thanks for his generous gift of flowers that adorned our tables. We are indebted to Mr. Edgar Sanders, the Horticultural editor of the *Prairie Farmer*, for his presence among us, and for his interesting talk on subjects with which he is intimately connected. We feel greatly indebted to the State Horticultural Society of Wisconsin for the representative it was pleased to send to our meeting, and we wish to extend to this Society our hearty greeting and appreciation of the valuable services rendered by its delegate, Mr. Hatch. We appreciate, in Mr. Hatch, a man of practical ability, and we thank him heartily for the interest he has taken in us, and also for the valuable instruction and useful information we have received from him. We desire especially to mention the newspapers of this city in this report. We thank them for the manner in which they have advertised our meetings and published our proceedings. We desire further, and lastly, to extend to each and every one, who has in any way, contributed to the success of this meeting, the hearty thanks and appreciative acknowledgment of the Horticultural Society of Northern Illinois.

M. N. BALDWIN,
S. G. MINKLER,
S. G. SOVERHILL. } *Committee.*

TRANSACTIONS

OF THE

TWENTY-EIGHTH ANNUAL MEETING

OF THE

HORTICULTURAL SOCIETY

OF

NORTHERN ILLINOIS

HELD IN

Marengo, December 5 and 6, 1894.

REPORTED BY
J. L. HARTWELL, Secretary,
DIXON.

OFFICERS FOR 1895.

PRESIDENT.....C. C. MILLER, Marengo.

FIRST VICE-PRESIDENT.....A. BRYANT, Princeton.

SECOND VICE-PRESIDENT.....C. U. GEETING, Rock Falls.

THIRD VICE-PRESIDENT.....H. R. COTTA, Freeport.

SECRETARY.....J. L. HARTWELL, Dixon.

TREASURER.....L. WOODARD, Marengo.

LIST OF MEMBERS

Auschick, C.	Market Gardener	Ottawa
Auschick, E.	Market Gardener	Mendota
Austin, A. B.	Nurseryman.	Downer's Grove
Barnard, O. W.	Farmer	Manteno
Bennett, Chas.	Small Fruits	Belvidere
Bennett, H. J.	Small Fruits	Belvidere
Buckland, J. V.		Ringwood
Bryant, A.	Nurseryman	Princeton
Cotta, J. V.	Nurseryman	Nursery
Cotta, H. R.	Nurseryman	Freeport
Carmack, W. A.		Marengo
Geeting, C. U.	Small Fruits	Rock Falls
Hartman, M.	Small Fruits	Sterling
Hartwell, J. L.	Small Fruits	Dixon
Hatch, Fred	Farmer	Spring Grove
Moore, A. F.	Farmer	Polo
Miller, C. C.	Apiarist	Marengo
Powell, C. R	Small Fruits	Sterling
Piper, D. J.	Small Fruits	Forreston
Prescott, H. W.	Nurseryman	Marengo
Richard, G. B.	Farmer	Woodstock
Richards, McD. Thos.	Farmer	Woodstock
Rackley, A. C.		Malden
Sanders, Edgar	Editor	1639 Belmont Ave., Chicago
Swazey, R. E.	Small Fruits	Rockford
Seeley, Edmond	Small Fruits	Yorkville
Turner, Jas. W.	Small Fruits	Aurora
Uecke, Robt. C.	Evergreens	Harvard
Ure, J. C.	Florist	Chicago
Woodard, L.	Pickle Factory	Marengo
Young, J. N.		Chicago
Whitney, N. A.	Orchardist	Franklin Grove
Whitney, A. R.	Orchardist	Franklin Grove
Wright, L. S.	Small Fruits	Ashton

HONORARY MEMBERS.

Coe, J. R.	Nurseryman	Ft. Atkinson, Wis.

PROCEEDINGS

OF THE

TWENTY-EIGHTH ANNUAL MEETING

OF THE

Horticultural Society of Northern Illinois,

HELD AT

Marengo, December 5 and 6, 1894.

The Society was called to order at 10:15 A. M., Pres. J. V. Cotta in the chair.

The exercises were opened with prayer by Rev. Thornton, pastor of Methodist church of Marengo.

Short speeches followed, in which Dr. Miller, who acted as secretary of the first meeting of the society held at Mt. Carroll, spoke of the early history of the society. He was glad to be taken back into the fold from which he had been absent so many years.

Mr. Barnard—While not a professional horticulturist, I have enjoyed attending these meetings for many years. The calamities of past years are but teachers of better things to come.

Mr. Piper gave a very encouraging report of the bearing of his apple orchard, many trees being loaded with large, perfect apples. He manures and cultivates his orchard thoroughly.

Mr. Bryant gave quite a full report of the three experiment stations in this district, details of which will appear in report of the State society.

Pres. Cotta appointed the following committees:

Treasurer's Report—A. Bryant, C. U. Geeting, A. B. Austin.

Exhibit—A. Moore, R. C. Uecke, C. R. Powell.

President's Address—A. B. Austin, C. U. Geeting, D. J. Piper.
Obituaries—Edgar Sanders, O. W. Barnard, Dr. Miller.
Final Resolutions—O. W. Barnard, Fred Hatch, M. Hartman.

ADDRESS OF WELCOME.

MAYOR EDWARD D. SHURTLEFF, MARENGO.

Mr. President and Gentlemen of the Northern Illinois Horticultural Society:

It is to-day my privilege, as well as a pleasant duty, to extend to you the hospitality of Marengo on this the occasion of your 27th annual meeting or anniversary, and I would be led to do it the more cheerfully because coming, as you have, from all parts of northern Illinois and possibly southern Wisconsin, an empire in itself, to hold your annual meeting in our city, one of the smaller cities in this section, you are paying us a compliment and doing Marengo a favor, of which any of the larger cities in your territory might well feel proud. We are here to-day, as a city and a community to attest to you our high appreciation of the honor you have conferred upon us; to greet you with a most hearty welcome, and to warn you, Mr. President, that your only way of offending us is by not making yourselves perfectly at home during your stay among us.

However smaller our town may be than the cities in which you have been accustomed to hold your meetings, still I have the confidence to believe that, when your work is over here and you leave Marengo for your homes, you will bear with you the impression that our nurserymen and horticulturists, the lovers of nature and nature's fruit in our midst, have not been asleep. We pride ourselves that we live in one of the most beautiful and fertile valleys in northern Illinois, and yet, to have seen it fifty years ago and to witness it to-day, one would not recognize it as the same. The hand of man has beautified and adorned it with that which is pleasing to the eye. The fertility of the soil has been made to produce many of the different and delicate plants that minister unto men's wants until to-day it is a veritable garden.

We have had leaders in our midst, men who for thirty years past have taken this subject of Horticulture in hand and carried it to success; and to them more than to the general public is the beauty of our surroundings due.

I can remember, twenty-five years ago, when a nurseryman in Marengo was setting out some evergreens for my father. He set his men at work and gave them their instructions and upon leaving the

yard he turned to his foreman and said; "Do your duty, Duffy;" and the nurserymen in Marengo, at least, have been "doing their duty, Duffy" from that day to this.

To none of our citizens is any more credit due for interest, enterprise and push in this matter than to the Hon. Loren A. Woodard, the trusted treasurer of your society and the honored ex-mayor of our town. He has been the leader, alert and pushing, and has ever borne a large part of the burden of civilizing this community, horticulturally speaking upon his shoulders.

I trust your meeting here to-day and to-morrow will be a very large success and that you will one and all go away from here with many new ideas and with broader purposes. The freedom of our little city is yours. We also take considerable pride in providing for your use, this, to us, beautiful opera house, for, however small and countrified our town may be in other respects, we feel that we have a place here where we can come and be upon a par with our much larger neighbors. We trust you will use it and enjoy it and that you will enjoy your stay here and that our hospitality and welcome may be such that, in future years, you will feel that you have an incentive to come again.

The address of welcome was responded to by Edgar Sanders in a few well chosen remarks.

TREASURER'S REPORT.

L. Woodard in account with the Horticultural Society of Northern Illinois:

AMOUNT RECEIVED.

Feb. 28, 1894—By balance in treasury	$280 18
" 28, 1894—Membership fees	48 00
Total receipts,	$328 18

CASH PAID OUT.

Feb. 28, 1894—J. L. Hartwell, secretary, for compiling transactions	$25 00
" 28, 1894—J. L. Hartwell, secretary, expenses of office	22 36
" 28, 1894—O. W. Barnard	75
" 28, 1894—A. L. Hatch, delegate from Wisconsin	2 50
" 28, 1894—J. V. Cotta	11 07
" 28, 1894—C. A. Saffle	4 63
Nov. 6, 1894—The "Dixon Sun," for printing	7 25
	$73 56
Nov. 6, Balance, Cash on hand,	$254 62

PRESIDENT'S ANNUAL ADDRESS.

J. V. COTTA, NURSERY.

Fellow Members and Friends:

Another year has passed since we met in re-union at Princeton; another year, with its hopes and disappointments, its successes and its failures, marks, like milestones on a highway, the progress of Horticulture in our beloved northern Illinois—for some progress we certainly have made—and to-day we find ourselves once more assembled in convention, to report and discuss the lessons taught by another year. By invitation of her public-spirited citizens, we have met once more in this beautiful little city of Marengo, which has made our acquaintance in years gone by; and tho' most of us, as individuals, may have come here as strangers the Society, as an organization, comes as an old friend to meet and visit once more her good old friends of former days.

We have not come here as teachers, but rather as students, as learners, who have met for the purpose of interchanging our thoughts, our views and opinions that are based upon the experiences of the past, in order to become better fitted to lead the public at large onward and upward in the development of the wonderful natural horticultural resources of our soil, which the All-wise and Beneficent Creator has, so bountifully deposited within our reach, yet which are still largely hidden from our eyes, and which have so far largely eluded our grasp by reason of a lack of that practical knowledge that is so much needed in order to bring about such development.

Inasmuch as Marengo stands as one of the oldest pioneer landmarks of Horticulture in northern Illinois, which has done perhaps more for horticultural advancement than any other place in our northern district we have the best of reasons to expect from her horticultural people much information that shall be instructive and encouraging, and shall lead us on to better accomplishments in the future. At this place also is located one of the three Northern Experiment Stations, from which, no doubt, we shall learn valuable lessons.

Opportunities will be given for full and free discussions on all papers and topics presented, and a cordial invitation is extended to all present to freely participate in such discussions; for in much counsel there is wisdom.

That fruit growing is entirely practicable and that it can be made remunerative in every part of our great State admits of no doubt whatever, for I need only refer to the splendid exhibit made from Illinois throughout the season of the World's Fair—an exhibit that certainly was not excelled by any of her sister States in quantity, quality and appearance of the fruits indigenous to her climate, notwithstanding the fact that large tracts of her territory suffered greater or less fail-

ures of the fruit crop during the season of the great show. Our State and County fairs generally bring out most excellent fruit exhibits, which clearly prove our capacities in this line of products.

The idea that the southern district of our State is the one especially adapted to fruit culture and that northern Illinois is not a fruit country has generally been acted upon by the settlers of the respective divisions; yet, this year we have experienced a complete reversion of that idea. For, notwithstanding the heavy frost that visited the northern part the State on the 6th of June last, and which greatly reduced the yield of our berry fruits, we still had a reasonably fair crop of small fruits and an abundant crop of apples, while southern Illinois suffered an almost complete failure of all the fruit she raises; a calamity which caused much privation and distress among those who had nothing else to depend upon for sustenance. These untimely frosts do occasionally visit most countries and are factors with which the fruit grower does well to reckon, so as to plan out and to arrange his plantings in such a manner that the failure of any one crop may not deprive him of an entire year's income. Bonanza farming in fruit culture is about as risky a pursuit to enter upon as bonanza farming in wheat culture has proved to be in the Dakotas. Diversified farming has always proved the surest and safest mode of husbandry.

In many sections of our district the cultivation of small fruits for market might be made renumerative, as that industry is yet far from being overdone.

It would also be a matter of congratulation if a goodly number of our farmers would intelligently embark in the growing of winter apples for market as an additional source of income; for, although there is, in fairly favorable seasons, a surplus of fall apples grown, it is a fact that the actual supply of winter apples is so entirely inadequate to the demand that large importations have to be resorted to from other sections to supply the regular, heavy, annual demand for these fruits, at least in part; and if we can grow them successfully in sufficient quantities to supply the local markets, why could we not go a step further and grow them for shipment to less favored sections of our country? Sure enough; echo answers: "Why not?" Why keep on from year to year paying out large sums of money for an article that we might produce in abundance and to spare, rather than make such articles a source of heavy expense?

Even now, less than three months after such a bountiful crop of apples as were harvested this year, the fruit merchants of most of our towns and cities find themselves obliged to import apples by carloads from Michigan and New York to supply the demand of their respective localities.

But at the bare mentioning of growing winter apples for market in northern Illinois I expect nothing, even from this audience, but smiles of incredulity or scepticism; for have not the trees that

we planted in our orchards time and again been destroyed by the several test winters that have succeeded each other in irregular intervals ever since the first great destruction that occurred in the winter of 1855 to '56? And what of the winter apple trees in our orchards to-day? Are they sound and vigorous and thrifty and productive as they ought to be; or are they not more or less damaged and crippled and sick? And what of those foreign sorts that were brought here from the land of the Czar with so much "flourish of trumpets?" And where are the late keepers of good size and good quality that were promised us from those importations? Surely twenty odd years ought to be a sufficient length of time to allow them for probation in a new country. But alas, the Russian winter apples ripen mostly in September with us, while a number of them are of a quality that could barely satisfy the taste of a Kossack or perchance a Sioux Indian. Whence then is our supply of trees to come from that shall resist the destructiveness of our frequent test winters and remain healthy and vigorous and productive of liberal crops of late keepers of good quality during a reasonably long period, say thirty or forty years ?

In answer to a question like that, my friends, I would say: Affiliate yourselves with your Horticultural Society by becoming members; read and study the reports and discussions which you will find in the book of Transactions and acquaint yourselves with the different modes of propagation by which trees are grown; pay particular attention to the reports of the Experiment Stations located in your district and make your selection for your orchard, be it for family use or for market, according to the best information you can obtain from these sources; and if your local nursery for some reason or other does not grow such trees as you require for your best interests, then learn to propagate them yourselves; but never let the irresponsible tree peddler or the agent of some thousand acre nursery located hundreds of miles away in amore genial climate inveighle you into buying his wares, if you wish to become a successful orchardist. By the use of improved modes of propagation, the selection of proper varieties, reasonable care and attention to the trees, good cultivation, the combating of noxious insects and fungi as well as rabbits and mice, and, further on, proper attention to harvesting, storing and marketing of the fruit will bring well merited success always. That man who says such things cannot be done in northern Illinois labors under a most grievious mistake.

Forestry has never received the attention its importance demands. Instead of husbanding the resources of our natural forests and timber lands to the best possible advantage, it seems that the owners of such lands have for many years almost vied with each other as to who should be capable of causing the most rapid destruction of valuable timber. The woodsman generally selects the finest and most vigorous trees and cutting them down for no better purposes than to be used as fuel, leav-

ing the stunted cripples that stood under the felled tree standing, and all this under the mistaken idea that now, after the larger tree has been removed, the smaller trees left will now have plenty room to grow; the result of such a senseless proceeding being the very opposite from what was intended. Those stunted trees having already lost their vigor, which will never return, by being overshaded by that larger, thriftier tree, which actually produced ten times more new timber annually than those left standing, and which would have answered his purposes quite as well. Now after the removal of the best trees the land must be made to yield pasturage, for the farmer could not afford to let so much grass go to waste. But a few years of such reckless practices and the glory and also the value of his grove is disappearing; the trees dying off in large numbers, while those still living don't grow any more and then he wonders what ails his trees. There are also many hillsides too steep for cultivation and which yield but scanty pasturage, which could be made vastly more productive of wealth by being planted with valuable timber, if their owners could be induced to do so. The State not having reserved any forest lands we cannot look to the legislature for laws for the protection of timber, having no power to interfere with individual ownership.

The embellishment of rural homes with ornamental trees, shrubs and flowers is as yet far too much neglected. It seems to me that if our people were better informed in regard to these things, if they really understood, how much pleasure and satisfaction and contentment and love of home could be gotten out of but a small outlay of money, when associated with a reasonable amount of taste and good sense in the arranging, planting and care of a few well-selected specimens of evergreens and other ornamentals it would not be many years before ever home might be transformed into a little earthly paradise; and its denizens into a more contented and happier people; into better parents, better children, better neighbors, better citizens and likewise into better Christians.

As the years have passed many of our early members have been called home from their labors and will never more meet with us upon earth; but their works are still seen among us in the beautiful plantations which dot our prairies in many localities; in the adornment of our towns and cities with stately trees and beautiful flowers; and also in the establishment of public parks. Though planted by other hands, to the early pioneers of the Society is largely due the honor for the existence of these plantations. And as we cherish the memories of those men, let us try to realize that we also have a mission to perform in the development of the resources of God's own country here below, to which we are called as stewards for a little while only. Let us prove worthy of this stewardship.

To the young men who have in recent years affiliated themselves with us I would, in behalf of the Society say: Welcome, thrice welcome

to our fraternity and to our labors. We would most cordially invite you to induce other young men to join our ranks; for soon, very soon the burden of labor must be laid upon your shoulders and you will need all the co-operation you can get from those who possess strength and energy and courage and enthusiasm and hope, to carry on the good work. So let us labor on, friends, in this, the most ancient as well as the most honorable pursuit of earth, and whenever the time shall come, that every orchard in this district shall be a model of its kind, and every tree shall stand in its place in a symmetry of its own and in perfect health and vigor and beauty, like soldiers on dress parade; when every fruit plantation shall be perfect; when every family in the land shall live in their own little Eden in peace, in contentment and happiness, supplied with an abundance of rich, luscious fruits the year round; when the laborer in his humble cottage shall enjoy his horticultural pets as well as the millionaire with his costly palaces and parks, this Society may consider her labors ended, her mission accomplished, but not till then.

THOROUGHNESS IN HORTICULTURE.

O. W. BARNARD, MANTENO.

Mr. President:

Horticulture as a profession, or merely as a means of pecuniary profit, requires about the same amount of business sagacity and tact that any other business does, involving the same amount of capital.

To be a thorough horticulturist in the profession of Horticulture, requires several very important qualifications, among which are, first, an early training in the business; a complete comprehension and practical education; a deep and abiding love for the calling; a taste for it that is ever present and sustaining; a faith that is unswerving and steadfast; these traits, combined, wifh only fair business acumen, will be a guarantee of success, because the work will certainly be thoroughly done.

Those engaged in professional Horticulture may be divided into two classes, the one that grows young trees and plants for the many or the million, and the one that grows fruit to feed the world. As the writer belongs to neither of these classes he cannot be accused of partiality or unfairness in the treatment of the subject; he therefore craves the indulgence of those so engaged, while he speaks in general terms of what he considers the best methods to warrant success. It is an axiomatic principle that, "Whatever is worth doing at all, is worth doing well," and it applies with much force to the pursuit of Horticulture. Have the best of everything, and then have "thoroughness," as a motto posted over all your gates, and see that it is enforced all along the line. Now this is addressed especially to the nurseryman, and I

realize, when I say it, how hard it is to live up to, but it pays to have the best nevertheless, for the best sells itself and always carries with it a good name, which ultimately establishes a character that all are glad to pay tribute to. "Be liberal with the public, and the public will be liberal with you" is a maxim well established in commercial life; have a full assortment for the market, offer no inferior stock for sale, let everything be true to name and of the best obtainable, and never stint the measure, nor misrepresent your goods yourself, nor allow your agents to do so, and your fame will extend far around you, and well earned money flow in and swell your bank account. But pursue the opposite course in all respects, and see how soon the world will know it, and your only customer will be the sheriff who comes to sell you out and close up your business. What has been said about the nurseryman applies in like manner to the fruit grower and the florist; neither can achieve very great success without thoroughness in their work, not only in the work itself but in the whole scope of their operations.

In this age of progress and improvement the best is never good enough, it has to be made better; all seek to attain the utmost good, so the fruit grower must ever be on the alert for something better to supply this demand, and he can't afford to neglect it, for the public eye is quick to discern and discriminate againt the inferior or lower grade to the detriment of the producer; when the common or lower grade of berries sell for ten cents per quart, and the better or superior quality is sought after at fifteen cents per quart, it requires no very great depth of wisdom to discern that "thoroughness," in all branches of the business pays; and not only in growing berries but all kinds of fruit as well; when size, quality, condition, full measure, quality same top and bottom of package, culls removed and the package neat and tasty, the utmost for the time being has been attained.

But it is the other man, the amateur, I intended in the beginning to address my remarks to (as the professional is supposed to have given proper attention to the business); he is the man I am after—he is very numerous; there are millions of him; and the importance of raising the standard of horticultural education among the masses, is, I take it, the prime object of this association.

The individual who is the happy owner of a piece of land, let it be large or small, should be endowed with the natural taste and zeal, and properly instructed in the principles and practice of Horticulture, to be able to plant and properly cultivate trees, shrubs and plants adapted to his location, without the least hesitation, and in the most thorough and successful manner, to the end, first, that he may add to the supply of healthful food products of the world; second, that he may aid in beautifying the earth, and, third, that he may add something to his moral stature in so doing. For no man, or woman, can be thoroughly bad who loves the practice of Horticulture. The per-

son so endowed and instructed will begin by making out a list (which he may revise many times) of plants, seeds and bulbs to begin his garden and orchard with, knowing that each is of the best obtainable and thoroughly adapted to his soil and climate; and then he will have his land in the very finest condition by timely plowing and cultivation, and the planting will always be seasonable, and each particular rootlet and seed will have the closest and most careful personal attention of of the planter, and then daily attentions after planting in the early stages of growth will always determine the proper course to pursue with each particular variety of plants, with a view to the most perfect development; and with such a course carried out to the end, it takes no prophetic eye to see what the harvest will be. This we will admit is an extreme case, and the coloring a little too high, so we will offset it with an illustration from real iife. A young farmer, whose education was limited, and whose horticultural knowledge was *nil*, but whose ambition was commendable, was engaged in improving a new farm, when some charitably inclined missionary tree-peddler had, by glowing descriptions of the fruit his trees would bear, induced him to buy a bill of apple trees for the orchard of his new home. The trees were received in good season, and the bundle laid in the shade on the north side of the house, so as to be sure they would be in good condition when he wanted to plant them; the spring work was driving him, and he postponed the planting of his trees from time to time, in order to get crops in which were of more importance; and of course the roots of the trees were in the shade and could wait, as well as not until he got ready; so time ran on and the trees waited until it got to be about the first of June, when he decided "them trees" must be planted, but he had no time to do it and the site was a stiff sod, which had not been plowed yet, and there was no time to do that. So he directed the hired man to take the post auger and bore holes and plant the trees; if the roots were too long to go in easily, to cut them off, "and have the job done in a hurry;" and then, to afford the trees the best possible condition for growth, as the weather had got warm and nice, he had the cows turned into the orchard to keep the grass eaten down out of the way of the trees. Some may think the above recital a fancy sketch drawn wholly from the imagination, but on the contrary I assure them it is a fact drawn from actual life and I offer the case here as a plea for the existence and labors of this society; proving the urgent necessity for more thorough and efficient work in behalf of that large class of people who remain in profound ignorance of the beautiful and useful art of Horticulture.

Now friends and members of the Horticultural Society of Northern Illinois, I wish to enter a plea for progress; are there not some new lines along which our efforts would avail us much? As a rule, the officers have done their duty faithfully, and I am not disposed to find fault with local committees or individual members, but can't some plan be

adopted by which the younger people of both sexes will become more thoroughly identified with our work? The older members will soon have finished their work and passed away, then who can take their places if none have had the neccessary education and experience? Last winter, at Princeton, we did well in enlisting the young people in the work, and I would be pleased if we could get out of old ruts and make an advance all along the line. Not that I feel myself capable of directing, but merely to express a wish and a hope for improvement.

We get in the habit of thinking if we do about the same, or do as well as we did year before, we are satisfied; but can't we arouse a deeper interest in localities where our meetings are held, and get a larger and more enthusiastic local attendance? By putting in more literary and musical exercises in our programs, we induce people to attend who thereby become interested in Horticulture. Let us all awake to a full sense of the importance of the work we are engaged in, realizing that this society is the patron of the great State of Illinois, and that it devolves upon us to acquit ourselves in the discharge of our duties toward the State and the people with the utmost faithfulness and ability, to the end that the best and greatest results may be attained.

DISCUSSION.

DR. MILLER—In the matter of interesting young members, are we not somewhat in fault? Have we not, as old members, rather absorbed the work of the program?

MR. BARNARD—Old people grow conservative. Young people are consequently timid. Encourage young members. Don't be too critical.

MR. PIPER—My earlier experience in the society confirms Mr. B.'s statement. I was afraid to express what few thoughts I had.

MR. SANDERS—In florists' meetings young people lead. Get the same activity in nursery work and fruit-growing and they will lead there.

THE PRESIDENT—The dollar is the thing that moves. Discouragements and adverse conditions have driven many out of our work and discouraged many.

MR. BRYANT—Carelessness in planting and general care of orchards, etc., has much more to do with failures than quality of stock. In years gone by, men would go thirty miles for trees, and nurse them with the tenderest care, while now they will hardly cross the street for them, and when planted give them no care.

Mr. Powell—I can endorse Mr. Bryant's statement. Ground in earlier times was in good condition. The strength of soil has been removed by heavy cropping. There were no insects or fungous enemies then. Now things are different. Trees are not as long lived now as back in early days.

Mr. Hartman—The answer to the question why young men are not interested in Horticulture is found in their failure to see money in it.

Dr. Miller—In the beginning fruit growing was not successful here. The failures were even worse than now. Studying and selecting varieties remedied this for a time.

QUERY BOX.

How far apart should trees in apple orchards be planted?

Mr. Woodard advocated planting close and thinning as trees grow older.

Mr. Sanders endorsed the idea and referred to the custom in Europe where trees are set close and kept small. Young trees are the best fruiters.

Mr. Bryant—Until we have a more refined Horticulture greater distances are desirable. Trees allowed to grow at random cannot be cultivated or in other ways cared for properly when planted closely.

The President—Much depends upon varieties. Yellow Transparent which bears early can be planted close. While for Ben. Davis, much more room is needed. Close planting in Europe is done by pruning and diversifying.

Should Early Richmond cherries be on Mazzard stocks?

Mr. Prescott had lost many trees so treated.

Mr. Austin favored it. Had used long scions and set trees five or six inches below surface.

Is the Abundance plum hardy in this section?

Mr. Coe—I have had them growing in Wisconsin for several years without killing back.

Mr. Bryant—They have come through the winters at Princeton for several years in good condition.

The secretary saw several quite large trees at Cherry Valley that were healthy and had borne fruit.

FUNGOUS DISEASES OF PLANTS.

G. P. CLINTON, ASSISTANT BOTANIST, STATE EXPERIMENT STATION, CHAMPAIGN.

Mr. President:

We can trace most diseases of plants to three great classes, namely, physiological derangements variously caused, insects and fungi. It is of the latter that I have been requested to write. Broadly speaking, fungi include a large class of plants, usually of microscopic size and hence of quite simple structure and of low development, which are destitute of that green coloring matter of flowering plants by means of which they are enabled to change the elements of the air, water and earth into food. It is necessary, then, that fungi have some organic matter for food. If the fungus takes this from a living body, we call it a parasite; if from dead matter, then a saprophyte. Toadstools and canned fruit moulds are examples of the latter; the disease producers in rusted grain and scabby apples are examples of the former. A parasitic fungus, then, is nothing more than a very small plant that is living on another plant or on an animal at its host's expense. These plants have reproductive bodies called spores that correspond to the seeds of flowering plants. These spores germinate to produce the fungus, as must the seed to produce the plant. As it is necessary for the seed in germinating to have proper conditions of moisture, soil, etc., to produce the plant, so it is necessary for the spore that it germinate in moisture not ony on certain plants but frequently on certain parts of those plants which act as a host for the fungus thus started. As a general rule leaves are the points of attack, and the fungus gains entrance either by boring through the epidermis or by growing its germ-tube through the small openings known as breathing pores. The fungus threads then push their way between the plant cells, obtaining their food from the latter quite often by sending short threads directly into them. At a certain time in its life the fungus begins to form its spores on or near the surface of certain parts of the plant. It is often, as in the case of grain rust, merely masses of these spores that we see and call the disease. The detrimental action of the fungus consists in robbing from its host the food that the latter had made for its own use, also often in inflicting the more direct blow of injury to the cells, either by the immediate action of the fungous threads or by the poisonous products they form.

Such being in brief the life-history of these parasites, it stands to reason that preventive measures must be along the following lines: First, the destruction of affected plants or their parts, thereby killing or preventing from maturing the spores. Second, the selection of seed,

stock or ground free from spores of the fungus to be evaded. Third, the planting of varieties of plants that are not liable to attack, as we sometimes find to be the case. Fourth, the destruction of spores on those parts of the plant where infection takes place before they can enter by germination into the plant. These are all preventive measure, as there is no curative process in the treatment of plant diseases. It is under the last of these heads that comes the treatment by spraying that of late years has become a common and in part successful operation. The value of spraying lies in the fact that it applies to the surface of plants certain chemicals that either kill or prevent the germination of the adhering spores and such that are later brought to the plant. Hence the two prime features in spraying must be to have a fungicide, as it is called, applied early enough in the season to prevent the entrance of the fungus into the plant, and to have it composed of such chemicals as will affect the spores unfavorably without injury to the plant. A great many different solutions, mixtures and powders have been used, but the one that has given by far the most satisfaction and the one now generally used is Bordeaux mixture. This was first used in the vineyards of France some thirteen years ago. Formerly it was used much stronger than at present; as used now it consists of six pounds of copper sulphate, four pounds of fresh lime and from thirty to sixty gallons of water. To prepare it grind fine the copper sulphate to be used, place it in a cloth bag and then pour the water through the bag, or rinse the bag around in the water. In this way the copper salt is easily dissolved. Slake the lime in a little water and then pour it into the copper sulphate solution, stirring the mixture meantime. Finally add enough water to make fifty gallons altogether. Fresh lime must be used, as air-slaked lime has a different chemical composition than the fresh. The use of the lime is to change chemically the copper from the form of a sulphate into copper hydroxide. This latter compound is supposed to exert the injurious action on the fungous spores. If all of the copper sulphate is not neutralized by the lime there is danger that the foliage of the plants sprayed will be injured, as copper sulphate has a caustic action on the leaves. In the formula given there is quite sufficient lime for this purpose. One way to tell whether all the copper sulphate has thus been changed is to stick a knife blade into the mixture, and if it has not the blade will become copper coated in a few moments. The mixture should be made in wooden vessels, and used as made, as it may deteriorate in time. The rule is to spray before any sign of the disease is manifested, and to repeat from time to time, as the solid matter left wears off, until danger from the germinating spores is over. Experience and knowledge of the fungus to be combated give the data as to time and num-

ber of sprayings. Usually from two to five are given. The benefit to be derived varies with different diseases. As a whole, however, spraying seems to have acknowledged merit, as is evinced by the growing use of it by those who are extensively interested in Horticulture. Sometimes it is desirable to mix an insecticide with the fungicide, and for this purpose Paris green is extensively used. Unlike most insecticides, however, Bordeaux mixture as used alone is not dangerous as a poison.

Having thus considered how to prevent such diseases of plants let us spend a few moments discussing some of the most important ones as found on the more generally cultivated horticultural plants of northern Illinois. Of the eight plants that have been selected the strawberry may first be taken. This plant is quite fortunate in not having many fungous foes. Perhaps the only one of importance here is the leaf blight. It is readily recognized by the rounded spots with purple borders that appear on the infected leaves. Some few experiments have been made to prevent this disease by spraying with Bordeaux mixture, and these are claimed to be fairly successful.

The raspberry and blackberry are so closely related botanically that their plant parasites are about the same. One of the most conspicious and best known of these is orange rust. This fungus is now known to become perennial in the plants in which it once obtains a foothold. It shows itself externally very early in the spring by the patches of bright colored spores that are produced on the lower surfaces of the leaves. This fungus is so vigorous in its attacks that whole shoots, especially if young, are killed and it is usually only a matter of two or three years before the whole plant dies. Spraying as soon as the disease appears, together with digging up and burning of affected shoots, is the treatment I should recommend. Leaf spot is a very common disease of these hosts. It produces small, roundish, purple bordered spot on the leaves in considerable numbers. Appearing in early summer it gradually becomes more conspicuous until the leaves drop off in the fall. It is a disease of which it is hard to tell just how much damage is caused. Anthracnoze is a destructive disease, appearing more particularly on the stems, especially those of the raspberry. It causes whitish colored patches, and is sometimes so destructive as to kill the canes. No experiments as yet give means of preventing this disease. Cutting out and burning affected canes at least can do no harm.

For the plum black knot is perhaps the most destructive disease in some of the Eastern States. Its ravages there are so great that laws have been passed concerning it. In this State, however, so far as I have observed, it is more apt to be found on its wild than on its cultivated hosts. It takes two seasons to fully develop, and at

maturity is easily recognized by the large knot-like swellings it produces on the affected branches. The destruction of the affected parts is the treatment usually given.

The worst fungous disease of the plum we have to deal with is the ordinary brown rot. To me this seems one of our worst diseases of fruit, for it occurs also on the peach, the cherry and the apple. I have seen the entire crop of vigorous peach trees destroyed by this fungus in a few days. The fruit, when affected, quickly becomes rotten, of a brown color, while the presence of the fungus may frequently be seen by the little tufts of spores that break through the skin. So far spraying experiments against this fungus, though limited in number, have not been very successful.

Plum pocket, a third disease of the plum, is readily recognized by the greatly swollen form the young fruit assumes, appearing as if stung by some insect. This disease is not so common or destructive as the preceding one.

The two worst enemies of the cherry seem to be mildew and leaf blight. The former generally limits its attacks to young trees or nursery stock, frequently doing considerable damage in the latter case. There should be no difficulty in preventing this disease by spraying. The leaf blight is also more apt to attack young than old trees. Certain varieties also suffer more than others. Mr. Fairchild, of the Department of Agriculture, reports spraying as successful in preventing this disease, but care must be used to wet the under sides of the leaves especially.

Perhaps the blight of pear is the worst disease that we have to fight. The apple also suffers, though not nearly so much, from the same cause. It sometimes seems as if it took but a day for the leaves of an affected pear tree to blacken and die from the disease. It is interesting to note that this trouble is caused by those smallest of organisms, bacteria, some species of which produce such frightful contagious diseases of mankind. Dr. Burrill, of this State, was the first to prove that bacteria caused disease in plants, and it was with the pear blight that he made his experiments. Mr. M. B. Waite, of Ogle county, is at present the special agent for the U. S. Department of Agriculture investigating this disease. He finds the bees, during their visits to the blossoms, are active agents in spreading the disease. Spraying with Bordeaux mixture at this time might be of use in preventing the spread of the disease. Vigorous cutting and the burning of affected parts is also helpful in this direction.

Besides the brown rot of the apple previously mentioned, scab and rust are two quite injurious diseases of this plant. Apple scab is caused by a fungus which is mostly external on the leaf and fruit, hence it is a very good subject for spraying- Numerous experiments at different places seem to indicate that this disease can be overcome

by the intelligent use of Bordeaux mixture. The rust of apple appears most conspicuously on the under side of the leaves. Looked at with a magnifier there are seen numerous fringed cups imbedded in the leaf. These are the fruiting bodies and are filled with the spores of the fungus. This disease is generally local, but is sometimes quite severe. It is but a stage of the cedar ball fungus which appears so conspicuously on cedars during the wet weather of early spring. Destruction of such balls, then, is helpful in preventing the disease on the apple.

The grape has four rather severe fungous combatants, all of which, however, have yielded greatly to spraying when properly done. The two mildews can easily be distinguished by the naked eye, as the powdery one forms a white web-like covering on the upper side of the leaf, while the downy one grows more in patches beneath or on the fruit. Botanically they are quite distinct. The worst disease of the grape, however, is the ordinary rot. This is of fungus origin. The severity of its attack varies greatly in different seasons, but it is always bad enough to be undesired. Systematic spraying against this disease has rendered the best and most profitable results of any of those that have been mentioned.

ENEMIES OF ORCHARD FRUITS.

A. L. HATCH, ITHACA, WIS.

Mr. President:

The great injury to orchard fruits by insects and fungi and their rapid increase from year to year may well suggest the question, Which shall triumph, our Liliputian foes, or the genius of the orchardist?

The advent of spraying as a help in orcharding has awakened wide-spread and general interest. While it is a powerful adjunct to successful orchard management, it is by no means a cure for all the ills of tree fruit culture. To be really helpful a more intimate knowledge of many things regarding insects and their habits is necessary as well as the life history of the microscopic fungous foes we have to deal with. In many cases the success of spraying depends upon very narrow limits, and this may be some peculiarity of the insect itself, or of the fruit, or of both.

THE CURCULIO,

the great enemy of plums and cherries, does not readily yield to spraying but we must depend upon the well-known jarring method which is a sheet supported by a light frame under the tree to catch the beetles as they fall from the tree when sudddnly jarred early in the day while the insects are still torpid with the cool air of morning. To this add the Ransom method of placing three pieces of bark as large

as the hand on the ground around the trunk of the tree and we have the best plan now known to control this pest. Under these pieces of bark the curculio will be found and should be removed about the middle of each afternoon, as they go into the trees at night.

CODLIN MOTH.

This little miller or moth lays its egg in the calyx or blossom end of the forming apple or pear. In a few days the egg hatches and the little worm eats its way into the fruit, where it grows and developes the worst trouble of orchard culture. In spraying we attempt to lodge a little poison where the tiny worm will get some of it before it gets into the fruit. *Hence we spray while the calyx is expanded and while the forming fruit is still standing upward upon its stem.* If we wait until the calyx closes, or until the apple or pear has turned downward, it would be too late to lodge the poison where we want it, and most of the little worms would already be inside the fruit, beyond the reach of the poison.

In our climate we have a second brood coming out in July to infest our late apples, and right here we meet with great difficulty. Professsor Howard, chief of the Division of Entomology at Washington, suggests a second season of spraying for the second brood in August. I cannot see, however, in what way it may be practical, especially from a sanitary view of the matter. Nor do I see how we could at that time get the poision to the point of entrance of the worm unless indeed it is different from that by which the first brood enters. There is a hope that if the worm enters at the calyx or blossom end of the fruit that we could make our first spraying so persistent that there would still be a little poison in the calyx ready for the second brood.

Now, however, until these problems are worked out by spraying, the situation would seem to suggest that for early apples harvested before the second brood begins its work, spraying is an efficient remedy, as good work means from ninety to ninety-five per cent free from the first brood of worms. Co-operation among orchardists to spray thoroughly at the right time to destroy as many of the first brood as possible, so one orchard may not breed this pest to spread abroad to infest other orchards and later apples with a second brood. *Let every orchardist spray!* Wormy fruit ought to be destroyed by hand-picking from the trees, if possible, before the worms leave the fruit, as they will in about three weeks from time of hatching. The old method of trapping the worms in cloth bands about the trees should begin in July and continue the rest of the season, receiving attention about once a week.

PARASITIC FUNGI.

Our tree fruits suffer from several kinds of fungi, of which apple and pear scab, plum rot, cherry mould and rot are the most important and which may in a large measure be prevented. One of the most effective preventives, is spraying with Bordeaux mixture. In this, as in spraying for insects, we should do so early, before the trouble has found firm lodgement and is past help for the season. In the case of apple scab the spores seem to live over winter on the twigs among the down at the ends and about the buds. A winter treatment, or spraying before growth begins, might prove a very efficient help, while another after growth and before bloom would be more necessary. However, at the time of spraying for codlin moth, especially if two treatments can be given, a combination of Paris green and Bordeaux mixture is of great value. It should be borne in mind that as the growth is continuous until the 1st of July spraying could with profit be continued till then but not later, for when all the leaves have expanded and have been sprayed they need no more. Leaves that grow after any spraying, of course are not protected until the next spraying, but if the mixture once dries upon the leaves it is very adhesive and not easily dislodged by rains.

The desirability of spraying renders it more necessary that trees be given ample room, the distance of twenty feet so long advised now giving place to thirty feet or two rods for apple trees. The low tops so long advocated must give place to those of medium height, that spraying operations be better carried on as well as that higher limbs are less liable to mould and scab than very low ones.

ORCHARD CULTURE.

It is remarkable that so many leading horticulturists ignore the fact that the growth of new buds, leaves and twigs of apple and pear trees in orchards is completed in this climate early in July, while plums and cherries finish their growth much earlier. Any stimulus of culture or fertility to cause a second growth after that date is never safe, and often is very disastrous. There is no reason why the growth of a fruit tree should be made at any other than the right time to which nature points with unerring fingers. Nor should growth be made of any but the right materials. The excessively rich soil for grass or corn, one full of introgen, and less of the ash elements, may induce a growth of wood of poor quality, besides rendering the tree more subject to fungus attacks.

Every orchardist, by proper culture at the right time, can produce good leaves and cause a good growth each season, and unless he knows how to do this, and how to produce fruit buds, and how to carry them to fruitfulness, he does not know the A B C of orchard culture. More than this, he should know that good culture can do more to prevent fungus injury than spraying alone can.

THE HUNDREDTH MAN IN HORTICULTURE.

FRED HATCH, SPRING GROVE.

Mr. President:

The propensity to follow a leader accounts for all the crazes that have afflicted humanity through all history. In modern warfare those regiments are strongest whose bayonets can think; so the plows of the future must think.

It is the hardest thing in the world be the hundredth man, with thoughts and feelings all one's own and out of the ordinary line. He neither feels bound to lead, nor yet to follow, but is self-contained, is a ready man; the right man in the right place and knows how to take advantage of opportunities and will not try the experiment of cultivating his orchards with swine, or weeding his garden with sheep, nor need a tree agent to tell him that Mr. Bryant's budded trees are far superior to Mr. Prescott's root-grafted trees; nor that Dr. Peck's low down trees cannot hold a candle to Mr. Cotta's top-worked trees, but he will be firmly fixed in the faith that a good thrifty tree with good roots is the best kind of tree, and has his own opinion as to how it can be best produced.

He is a republican inasmuch as he believes in encouraging home industries and will patronize his own nursery.

Nor is it necessary to tell him he must have a north slope and a light clay loam whereon to plant his trees and seeds, for he has already decided to plant them on *good ground*, to cultivate them thoroughly "lest the thorns spring up with them and choke them," and should they not "bring forth an hundred fold" he has had the joy of doing and dwelling with nature with whom he is in concord and harmony.

The hundredth man in Horticulture reaps his reward in making the world more beautiful and more pleasant to live in, and by his example of well doing. His well-kept lawn alone is a living monument to his worth, and a "joy forever" to the neighborhood in which he lives. It has been truly said, "that the man who plants trees, vines and small fruits, plants himself, as it were. He is anchored to the spot of earth which he improves and beautifies."

The hundredth man is never a slave to his occupation, but finds time to attend horticultural meetings, where he is a live member and does true missionary work and never goes home from such meetings without feeling he is a wiser and better man. He finds time to converse with and encourage friends and neighbors, and in his library "he dines with kings, reasons with philosophers, associates with poets and painters, and numbers the masters of thought of all ages among his personal and most intimate friends." He is an amateur,

which means he is in love with his business; he grows flowers and shrubs for their beauty and fragrance, and fruits for their color and flavor, and courts quality rather than quantity. He knows that the beautiful red Benoni and Jonathan are good varieties of early and late dessert apples, and that the Duchess and Ben Davis are fair specimens of early and late cooking apples.

He grows many varieties, some for their exquisite beauty and flavor, some for their can't-do-without-ness and some for old recollections' sake, and if he makes a pecuniary profit from all this pleasure he is doubly blessed.

He is reasonably well posted on the subjects of parasites and fungi which infect his fruits and flowers, and is acquainted with the various mixtures that are used to destroy them, yet still believes that a knife and wire are to be preferred to a soap and lime wash to destroy borers in the trunks of his trees.

He is not prone to wickedness nor to the giving advice about growing an orchard, so says nothing about planting when the moon is four days old, if you want a "lamin" crop of apples when the trees are four years old, nor does he admonish you to set your trees "slap on top of a brick" if you want to grow it on flat prairie land.

He would be more likely to give you a hint on drainage, and may suggest that you subscribe for some good horticultural paper, the best you can find, as you cannot afford to be without it. He never makes merriment at the expense of the book farmer, for he knows he is here to stay. He has saved the silk and vine culture of the world from utter destruction by fungous and parasitic growth, by the use of Bordeaux mixtures, kerosene emulsions, etc. And this scientific knowledge applied to agriculture, horticulture and kindred industries, is going to count in all our productions.

The hundredth man, if he accomplish nothing else, will have a quite thorough knowledge of his own ignorance and knows there are many things he cannot do; many trees, fruits and flowers he cannot grow; but he sees and enjoys the rare blessings of his calling.

He thinks, correctly, that there is no calling under the sun more calculated to open one's eyes and ears and heart to the beauty, the harmony and the love of God. His aim is ever, then, to teach people to make their homes and lives more beautiful and better, to give them such instruction as their needs demand.

He should certainly be a happy man; he has no great fear of getting rich, and if he labors diligently he need not be poor; cares and anxieties which often harass merchants and speculators distract not his mind and after a day's labor of love among his plants and vines, or "planting of the apple tree," he enters his dwelling and a

spirit of undisturbed rest takes possession of his quiet home as he "wraps the drapery of his couch about him and lies down to pleasant dreams."

APPLES BY THE CARLOAD IN NORTHERN ILLINOIS.

AMOS F. MOORE, POLO.

Mr. President:

This subject which has been assigned me by your worthy secretary is one in which I am deeply interested. I have always been a farmer and breeder of stock, and have just entered the A B C class in Horticulture, and it is easier for me to raise the carloads of apples, than to tell you how, on paper.

You must have a proper location in which to plant the tree. If, in a rich, heavy, prairie soil, it must be well drained and should incline toward the north. I would plant upon the poorest soil, for the reason that the trees will be hardier and better prepared to withstand our cold winters.

In the fall wrap the trunks of the young trees with building paper, to protect them from rabbits in winter, and borers in summer. It will last two or three years. When they are old enough to fruit, nourish them by fertilizing the soil.

Go to the nearest reliable nurseryman to get your trees. Do not let the sun and wind dry the rootlets, and should you lay a tree down, cover its roots with earth or damp mulching. Set them twenty five feet apart, each way, and cultivate them by planting corn or potatoes. Six years from time of planting they should commence to bear fruit.

The key-stone in fruit culture is the sprayer. I first spray when the blossoms are falling, with a preparation of London purple, four ounces to fifty gallons of water, adding two gallons of fresh milk lime. We spray the trees once in two weeks, or until the apples are more than half grown.

There are each year two broods of the codling moth or apple worm so destructive to fruit. Spray promptly, and you find the fruit large, round and fair, otherwise the ground will be covered with apples about as large as walnuts. Last year there were few apples in this State, while I shipped by the carload. This fact I owe to the sprayer.

In northern Illinois we are in need of a hardy, good flavored winter apple. If diligent search should be made, I believe it could be found in some of the old orchards.

Would it not be well for us to offer a premium for a winter apple that would meet the approbation of this society?

THURSDAY'S SESSION.

SMALL FRUITS.

J. R. COE, FT. ATKINSON, WIS.

Mr. President:

This subject of varieties is, to my mind, one of the most important questions the fruit grower has to deal with, and this is especially true of the commercial grower. Being a small fruit grower I shall not attempt to discuss varieties of tree fruits.

As the strawberry is the first fruit to ripen and as there are more new varieties of it introduced than all others put together, it seems to me very proper that we consider it first. I think it is perfectly safe to say that not more than one variety out of every twenty that are introduced ever become popular or are generally profitable. Twenty years ago I started growing strawberries for market, and started with a list of twenty varieties. Of those we are only growing one to-day; the old Wilson. If you will take almost any small fruit catalogue of fifteen or even ten years ago, you will find a few of the varieties are well known and perhaps popular to-day, but by far the greater part of them are only a memory. In the discussion of varieties there are three distinct classes of growers to be considered all having practically the same object in view, namely, the best possible results for the effort put forth.

The first is the grower for the distant and large or wholesale market. Second, the grower for the home or near market, and third, the private gardener, or one who grows for his own home use. To those who grow for the large market and ship their fruit to one wholesale house it seems to me very important that they have but two or three varieties, for in this way only can a uniform product be sent to market and the best success attained. If your dealer can know that every crate of berries bearing your brand is just like every other crate he can send them to his customer with perfect confidence and you have established a reputation. If your berries are all good your reputation is good also; and if they are poor you will find it out when the returns come in. While I would not like to name the varieties (for every grower must determine this for himself) there are certain things that it would be well to observe:

First, that your berries must be firm enough to ship the distance you are from your market and arrive in prime condition, sound, dry, and fresh looking.

Second, that they should be at least of a fair size. Other things being equal, the larger the better, for a large berry will outsell a small one in any market I have seen.

Third, that the berry should be of an attractive color. I do not believe a faded, washed out looking berry will ever be popular in any market.

Fourth, that the pistillate and staminate varieties that are grown together should be as near alike in size, shape, firmness and color as it is possible to get them.

Fifth, that in order to be uniformly profitable it must be a healthy plant, a good grower and able to produce a large or at least a good crop under the varying conditions it must necessarily meet with at the hands of different growers.

Sixth, and last but not least, that the condition in which the fruit arrives on the market depends as much upon the grower as it does upon the variety. No variety can possibly be at its best in the hands of the careless slipshod grower.

The grower for the home or near market, where he can put his fruit into the hands of the retailer or consumer, may have a much wider range of varieties than the shipper. Some of our very best home market berries would be very nearly worthless if they had to be shipped far. For the home market we may grow the largest varieties even if they are not firm enough to stand much rough handling, and then it does not matter so much if they are not all of just the the same color. What we have to look for then in the home market berry is health and vigor of plant productiveness, large size, attractive appearance and good quality, and when we have it well grown to put it on the market fresh, bright and clean looking and I think we may safely expect a fairly remunerative price in almost any market.

The man who grows his own fruit may not only grow more varieties but may indulge his own tastes and fancies and grow some tkinds hat would be unprofitable for market but may be just what he likes. It is, to many, a great satisfaction and pleasure to have the very finest that can be grown regardless of the question of profit.

RASPBERRIES.

What I have said about strawberries holds good with raspberries, but not to so great an extent for there is not so much variation in size, color, etc. In the black cap class the berries all look a good deal alike and different varieties may be shipped together without detracting from their market value. With us the Palmer is worth all the other earlier varieties (that we have tried) put together, because of its fine fruit, great productiveness and, what is very desirable in an early berry, it ripens its whole crop in a short time, and coming on the market when prices are high makes it very profitable.

The Ohio is always profitable because of its good shipping qualities, rank growth and great productiveness.

The Older. Prof. Budd says of it, that it is the most valuable blackcap grown. It certainly is very productive of very large berries and seems to be heat and drouth proof, and entirely hardy every way. If it had a little more firmness of berry I think it would stand well toward the head of the list of blackcaps.

Of the older reds, the Cuthbert is the standard for growth, productiveness and quality, and is probably better known and more largely planted than any other one variety and is perhaps the best with which to compare new varieties. In our own experience, however, the Brandywine has been the most profitable of any, never failing to give us a good crop of large, firm, bright berries that always meet with a ready sale. There are two new raspberries being introduced this season, a description of which I think would be of interest to all growers and lovers of fine fruit.

The first of these is the Loudon, a Wisconsin production which originated with and is named after Mr. F. W. Loudon of Janesville. It is said to be a seedling of the Turner fertilized with the Cuthbert. In growth and appearance of cane, and size, shape, color, firmness and quality of fruit, it very much resembles Cuthbert. Its points of superiority claimed over Cuthbert are greater productiveness, better keeping qualities, a longer fruiting season by a week or ten days, and greater hardiness.

The second is the Columbian which originated with Mr. J. T. Thompson of Oneida, New York. It was raised from seed of the Cuthbert that was grown by the side of Gregg, and is believed by the originator to be a cross between the two. As I saw it on the originator's grounds the past season it was simply wonderful in growth of cane and productiveness, so much so as to be very hard to believe without seeing it. It resembles Cuthbert in shape, is somewhat darker in color, a little larger in size and very firm, never crumbles or falls to pieces in picking or handling. In quality it is equal to the Cuthbert and the originator claims it to be the best berry for canning purposes ever grown. It resembles the Gregg in that it never suckers like the reds but propagates from the tips, which to my mind is a great advantage. The berry will hang to the bush long after it is fully ripe and will finally dry up if left without picking. I saw a third of an acre of Columbians that had been allowed to grow without any summer pruning that stood ten feet high.

BLACKBERRIES.

The only varities of blackberries we have grown to any extent are Snyder and Stone's Hardy. They are too well known to need any description. Ancient Britain is doing well in most parts of our State and is very popular where best known. We have tried Erie and Minnewaski but neither has proven valuable with us.

CURRANTS.

While almost all the other small fruits have been grown extensively for years this much neglected fruit has been grown but little for market purposes, but to the few who have grown it, it has proven very profitable. As there seems to be but little difference in the price they bring in market, it is safe to plant the red varieties that yield the best crops. For an all around currant we have found nothing better than Victoria. The demand for white ones is quite limited and it would not be wise to plant largely of them.

GOOSEBERRIES.

Of late I have become considerably interested in gooseberries and have been trying some of the newer ones, and it may be of interest to some of you to know how they compare with the best of the older ones. Have fruited so far Industry, Red Jacket, Golden Prolific, Columbus and Triumph.

Industry is too weak a grower and too uncertain a cropper, unless it may be in very favorable situations where it can have partial shade, a heavy soil and high culture. Under these conditions it frequently produces splendid crops.

Red Jacket is a very strong grower and heavy yielder. Dr. Hoskins of Vermont says that he picked a half bushel of Red Jackets from a single bush the past season. The berries are the color of Houghton and about one-third larger than Downing. It is not of first quality being quite sour and thin meated. It is not an easy berry to pick, the thorns being long and stiff and the berries growing all through the bush.

Golden Prolific is a stocky grower and a good yielder of nice golden colored berries, about like Red Jacket in size and quality.

Columbus is of the largest size, golden color and good quality. The plant is a sturdy, stocky grower and productive. I have a good opinion of this variety and think it will prove valuable.

Triumph. This pleases me the most of any gooseberry we have yet fruited. It is a strong, free grower, and exceedingly productive of very large, yellow berries of the best quality. It is the easiest to pick of any I have seen; the berries being so large and so thickly set among the branches that they can be picked by the handful. There are very few thorns on the old wood and those on the new wood are short and weak.

GRAPES.

Of this valuable and delicious fruit there is an almost endless number of varieties all of which I suppose are of some value in some places, but after trying nearly fifty of them, have come to the conclu-

sion that the man who plants Moore's Early, Worden and Concord for black, Brighton for red and Niagara and Moore's Diamond for white, has a better assortment than if he had the whole list. I do not know about other markets, but find in our own home market that the black varieties will outsell the white ones. If I could have but one market variety I think it would be Concord.

DISCUSSION.

The secretary culled the following from a paper read by Mr. Powell. Much depends upon treatment, soil, etc., as to value of varieties:

STRAWBERRIES.

The Crescent is still a stand-by. It is an immense bearer and a good home berry. Warfield is probably the best bearing and market berry. It needs thorough fertilizing. I use Chas. Downing for fertilizer. Jessie does well for me. Michael's Early also does well and on account of early ripening the best prices are obtained. Shall use them to fertilize early varieties.

RASPBERRIES.

The Souhegan, an early berry, ripens all at once. Slender grower at first but the last year it has done better and promises well for next year. The Palmer is a beautiful berry, fair size and great bearer, ripening about four days after the Souhegan. Their season of picking is also short. The Ohio comes next, great bearer and season long. Next the Gregg, whose berries are very large, not of best quality but sell well on account of size. They are a strong, vigorous grower. The Shaffer, a dark red berry, great bearer, good canner, but soft.

Have set but not fruited Johnston's Sweet, Kansas and Older. Thompson's Early Prolific is the earliest red berry I have, larger than Turner and as good if not better bearer; their season is long.

Gladstone's Ever-bearing is rightly named but not worth raising, only as a curiosity. The Golden Queen, a little harder and earlier than the Cuthbert its parent, a great bearer. I like it.

MR. BARNARD—The average fruit grower has no business experimenting with all the new varieties. In a general way nothing quite takes the place of the Concord grape. Worden is not a good shipper, cracks open when ripe and drops off the vine.

Mr. Seward—Blackcaps do nothing in Boone county.

Dr. Miller's testimony seemed to conflict with Mr. Seward's.

Mr. Bryant—A few years ago raspberries and many other kinds of fruit seemed not to thrive. Diseases and other things were against them. There seems to be a change for the better.

Mr. Barnett—The average buyer will have little to do with high priced fruit. Size does not figure much when fruit is cooked, and as to flavor sugar is cheap.

Mr. Coe showed a bottle of red raspberries grown in New York, Columbian by name. The berries were remarkably large and, after tasting, all present declared of extra fine quality. A photograph of original plant showed them to be of wonderful vigor in growth and productiveness. The plants were from eight to ten feet high and loaded with fruit. They are thought to be a cross between the Cuthbert and Gregg.

PLANTING SMALL FRUITS.

J. M. WISE, FREEPORT.

Mr. President:

That old and well-known maxim, "What is worth doing at all is worth doing well," applies very appropriately to the planting of small fruits, and we believe if put into actual practice in the work of setting out fruit plants, and caring for them after they are set, will be rewarded with due success. In planting small fruits it is very important to have the land in the best possible condition before setting the plants. It never pays to plant so early in the spring as to have the ground bake and become harsh and lumpy. There is a temptation sometimes to do this, but it is far from right; it is much better to place the ground in excellent order and thus give the plant a good start and a proper foundation. The ground should be deeply plowed and worked fine and mellow, after this is done some growers firm the soil by rolling or pressing in some way and claim it to be an advantage. I have not tried this so cannot speak from experience in the matter, although I believe it would be a good thing on certain soils. The ground should not be left in a lumpy condition as it is very detrimental to the tender germ of the raspberry, etc., and is anything but encouraging to the growth of the strawberry. The ground should be free from sods or roots. One might plant with a degree of success upon such soil, but it is not at all advisable or prudent. It is said by good horticultural authority, that no after culture will make amends for imperfect and careless preparation of the soil, and we believe the saying is true.

The amateur fruit grower is sometimes prone to thus plant carelessly through impatience, but it is much the shorter and the better course to prepare the ground thoroughly and thus save time and expense and final failure. Any ground which will produce good crops of corn or potatoes will do for small fruits, but it must not be allowed to run down and must be kept up to a certain standard of richness if the best results are to be obtained. As to the time of planting, it is a conceded fact that the majority of growers favor planting strawberries in the spring. My experience is also on that side. However, small beds for family use can be planted in the fall and often to an advantage. As to raspberrres, blackberries, currants, and gooseberries, I plant whenever I can get the ground in proper order, either fall or in the spring. I have had excellent results from fall planting, and very late planting at that, and can confidently recommend it to others. Plants thus set should always be carefully mulched to prevent heaving by repeated freezing and thawing, which is very harmful to the roots. Fall set plants start early and make a fine growth the following season, which is a valuable point; if possible plant in the fall, but if you cannot do so plant in the spring, and do not wait until fall. In planting strawberries for field culture or large beds, I usually put plants from twelve to eighteen inches in the rows, and rows four feet apart. Plants can be set much closer for garden culture when not allowed to become too thick. I have been successful in planting raspberries in rows seven feet apart and three feet apart in the rows, following the so-called hedge system. There is a variation in opinion upon this subject and I will not attempt to enter into details at this time.

In closing this paper, I would remind the planter that while it is important to plant good varieties that it is equally important to plant good plants of those varieties. Poor plants of a famous kind will not do and good plants of a poor kind will not do, but you must have fine, well-grown plants of a reliable variety, one that is well suited to your soil and climate and you will then have a right to expect success.

This subject is inexhaustible, it is of vital importance to the fruit grower and we cannot touch it upon every side in so short a time.

THE CULTIVATION OF SMALL FRUITS.

J. BUFFETT, DIXON.

Mr. President:

Having the ground properly prepared and planted, the next thing in order is the cultivation of the young plants. Owing to the difference in soils and the varying amount of rainfall, no fixed rules can be given. We must often do as we can, not as we would. When the ground is wet and sticky all working will do more harm than good.

Strawberries, very soon after planting, should be worked with the cultivator between the rows, and hoed between the hills. The best implement to be used with the horse is one with teeth about one and three-fourths inches wide and sufficient in number to thoroughly pulverize the soil; adjustable to run at any desired depth. Such an implement can be run very close to the plants, leaving but little to be done with the hoe. The working should be repeated as often as the ground needs loosening or the weeds begin to start. After heavy rains, the soil should be stirred deeply, but during a drouth shallow working is the best. Much after-labor will be saved if the weeds are all killed and the soil is in good condition when the runners begin to mat. After the runners begin to grow the cultivator should be run the same way each time, so as not to disturb the plants that are rooted.

In hoeing the first time, if it is found that a plant has been too deeply set, or the rain has washed the earth over the crown, the earth should be removed so that the crown will be free. If the plant is too shallow so that the roots are exposed, the earth may be drawn around it. All blossoms should be removed, as the production of fruit taxes the vitality of the plant. The principal aim should be to produce strong plants in sufficient number to give a good crop the next year.

If, for any reason, the weeds have become so large that the small shovels will not destroy them, or the ground is so wet and flat that it is desirable to have the strawberries in ridges, then larger shovels must be used.

Care must be taken to remove all perennial weeds in the spring; for if let to grow they take possession before the crop is picked.

Many claim that the first runners should be removed, to give stockiness to the plants. I do not think it is quite safe to do it in this climate as we are so liable to drouth in August or September that we may be left with a poor stand. If the season is wet the plants will be strong enough to give a good crop. While some varieties do not make enough plants, other kinds, in favorable seasons, make too many. This may be remedied in a degree by destroying the runners during cultivation. If the plants could be about four inches apart in the matted row more and better berries would be obtained than if they were closer.

While it is best to raise plants in a seperate plat for setting in the spring, it is often necessary to go to the field intended for fruiting. If the plants are taken from between the rows they are usually small and of second quality; if large plants are taken from the edge of the row, the earliest and best bearing plants are removed and the yield diminished. From a thick row the plants can be taken out in strips of four or six inches wide across the row leaving the space between the strips somewhat wider. In a trial of this method last yea r

with a row of Warfield, the row seemed to bear even better than the rows that were not disturbed; but as a heavy frost hurt the berries while picking it was impossible to tell what the outcome would have been had the crop been all gathered.

As soon as the picking is over the vines should be mown and, when dry enough to burn, fired, burning the mulching and dried plants. If the mulching is very heavy on the rows part of it can be raked into the paths. When there is danger of the fire getting beyond control, the ground can be raked and the refuse drawn to some safe place and burned. The burning leaves the ground in better condition for working and the plants seem to thrive better.

With the mulch and leaves all removed the ground becomes very hard in the hot sun. The soil will be worked to a better advantage if the plow or cultivator is started immediately after burning. Dry as has been the last two years, a Planet Jr. with three inch shovels was sufficient to work between the rows. Following the large shovels with small ones and then with a common harrow, the ground was left in good condition. This was upon sandy loam; if the land had been stiff clay or had it been wet during picking it might have been different. Where the cultivator will not work, a plow with a mold board must be used throwing the furrows toward the center, then working the dirt back again, and finishing with the harrow.

No definite rule can be given as to how long it will pay to keep land in strawberries before plowing up. Sometimes it pays to raise the third and even the fourth crop. In one case, if it had not been for the third crop I would have had no berries for market. If, in a soil adapted to its growth, white clover makes its appearance in great abundance, it is useless to attempt to get a second crop.

The same general method used in working strawberries applies to blackberries and raspberries during the first year. The rows being from six to eight feet apart, something else can be grown in between. This is a good place to raise strawberry plants to be used the following spring. As it is desirable to have the wood well ripened for winter it is better not to cultivate too late. The plants having been trimmed the ground may be worked next spring as soon as in good condition. The working should be continued until the fruit is nearly ready to pick. The suckers between the rows of blackberries and red-raspberries must be treated as weeds and destroyed. After picking, the ground can be worked again. Blackcap raspberries, if pinched back at two feet and left to grow without further trimming, cannot be cultivated long and sometimes not at all after the crop is gathered.

The Shaffer's Colossal is inclined to fall down, making it difficult to work; this can be remedied by driving stakes and running a No. 8 wire on each side of the row.

As blackberries can be fruited more years than any other berry, it may became necessary to enrich the ground. A good time to do

this is in the late summer or autumn. The work will be much less if the rows are so arranged that a wagon can be driven between every third and fourth row.

DISCUSSION ON PLANTING AND CULTIVATING SMALL FRUITS.

MR. PIPER—I carry plants in pail with a little water. Make place with slender spade, set at angle, throw spade forward, place plant, after roots are spread out, behind spade, withdraw the latter and set foot on ground above roots.

SECRETARY HARTWELL—When ground is thoroughly prepared and marked run through each row with small turning plow throwing out but one row at a time, especially if the sun is shining. I prefer to fill in rather than dig out with hands when planting. I work on hands and knees after a boy who drops—can set 5,000 per day. Care must be taken not to set too deep in wet weather. Firming in is very important.

In working over a field after fruiting, the plants may be killed by burning or plowing if the ground is dry, which is usually the case here after the picking season. Frequently the loss of the last few berries to ripen is more than compensated for by the superior condition in which the plants for next year's crop can be put by starting to renew a little earlier.

MR. COE—I grow strawberries for a living. There is a good deal in the preparation of plants for setting, It is not always best to set plants as soon as received. Plants placed in a cool cellar for two or three days will start a great many little white fibrous roots and if set after this start is made will do better than when set before. The roots, however, must not be exposed for any great length of time. We use a stiff, straight-pointed trowel in about the same way Mr. Piper does the spade. The first hoeing we treat all runners as weeds. All runners that develop after sufficient plants are set should be treated in the same way, as the strength of plant should be used in forming fruit buds, not runners.

LOCATION OF NEXT MEETING.

A communication from the city council of Sterling inviting the society to hold its next annual meeting in that city was read and by unanimous vote of the society was accepted.

REPORT OF COMMITTEES.

We, the committee on President's address, cordially approve his suggestions, especially those on growing of apples in northern Illinois.

A. B. Austin,
C. U. Geeting,
D. J. Piper. } *Committee.*

Your committee appointed to examine the fruits will say, after looking over the same, that there was a very fine collection exhibited by C. W. Prescott of Marengo, consisting of ten varieties from his own and six varieties from the experimental grounds of the State Society. There were also six varieties shown by J. V. Cotta of Nursery, all of which were very fine; also six varieties exhibited by Mr. Cahoon of Belvidere, the Roman Stem among them, which is an apple we think should be more extensively cultivated.

C. R. Powell,
Robert C. Uecke,
A. Moore. } *Committee.*

The auditing committee, to whom the Treasurer's report and other matters of finance were referred, find them correct and recommend that they be accepted.

A. Bryant,
C. U. Geeting,
A. B. Austin. } *Committee.*

The election of officers for the ensuing year resulted as follows:
President, Dr. C. C. Miller, Marengo.
First Vice-President, Arthur Bryant, Princeton.
Second Vice-President, C. U. Geeting, Rock Falls.
Third Vice-President, H. R. Cotta, Freeport.
Secretary, J. L. Hartwell, Dixon.
Treasurer, L. Woodard, Marengo.

PRUNING AND PROTECTION.

H. R. COTTA, FREEPORT.

Mr. President:

This subject should receive the careful attention of the fruit grower.

CURRANTS.

A much neglected fruit. They must not be planted too close together. If they are, you will have a mass of puny shoots. Plant four by seven feet apart and deep enough so the base of the lower branches is covered with two or three inches of soil. This will make a more permanent bush than if planted with only one stem at the surface of the ground like a tree. In pruning always take off all shoots and branches that spread so close to the ground as to interfere with cultivation or so close that the fruit they produce will be of no value. Another reason for taking off lower branches is to give a better circulation of air close to the ground. Remove all dead, puny and weak branches and all twigs growing toward the center of the bush. Remove very little, if any, of the strong healthy shoots and branches, unless they grow too close together or out of shape. Very little pruning is necessary until after the third season's growth. Currants and gooseberries should be pruned in the fall, they need no winter protection in this climate.

GOOSEBERRIES

require much the same treatment as currants, but should be more severely pruned. They will need pruning after the second year's growth; should in no case be planted closer than the distance given here for currants.

BLACK RASPBERRIES.

Distance for planting, two and a half by seven feet. If they make a strong growth the first year, pinch off with your thumb and finger the tips of new canes as soon as they get about one foot high. You will have to go over your rows two or three times as the canes will not all be tall enough the first time. If they only make a light growth, will need no pinching the first year. The second year and each succeeding year, pinch off new canes when about two feet high. In cutting back canes or branches of red or black raspberries or blackberries, I always wait until spring, after growth begins, so I can tell, at a glance, just where to trim. Where sound I leave branches or laterals from one to one and a half feet long. Where injured or killed I always cut back to sound wood, allowing some of the sound branches longer to partly make up for those that are cut short.

RED RASPBERRIES.

Pinch and cut back about the same as for black raspberries. Plant two and a half by six feet apart. Keep all suckers that come up around the hills pruned off, with hoe or cultivator, from one to two inches below the surface of the ground. Don't allow more than six canes in a hill, and don't allow the hill to become more than one foot in diameter, at the surface of the ground. I grow Turner very successfully, planted one and a half by five feet, allowing the suckers to remain in the row, but not allowing it to spread more than six inches wide at the ground. When grown in this way, I do not pinch during the summer, but cut back in the spring to about three feet above the ground. The weakest canes I cut away entirely. I cut off old canes of raspberries after fruit is gathered. Of course different varieties have different habits of growth, and require a little different pruning, but the same general principles will hold good, to a certain extent, for all kinds.

BLACKBERRIES.

Plant three by seven feet apart, and when convenient rows should run north and south. The first summer pinch the young canes off about one and one-half feet above the ground, the second year two feet, and each succeeding year from two to two and a half feet. Cut back laterals in the spring, after growth begins, leaving them from two to two and a half feet long Blackberries do not fruit as close to the main cane as raspberries, and on this account laterals should be left longer. They require richer and moister soil than raspberries, and must have high cultivation, and all suckers must be kept cut off.

GRAPES.

I prune grapes in the following manner: The first summer allowing only one or two canes to grow, pinching off all others to one or two buds each. In the fall I cut back the canes, leaving them one or two feet long. The following spring I allow only two canes to grow, pinching all others back as before. I train them on a wire trellis, composed of six No. 12 galvanized wires. The first wire eighteen inches above the ground and the others six inches apart, making the top wire four feet from the ground. After the second summer's growth I cut the two canes back, leaving them from one to four feet long, according to their strength. The next year I allow from two to six canes to grow and cut them back according to their strength, and so on, being governed by the vigor and

size of the vine. I allow new canes to start from near the ground occasionally to take the place of old ones after they become exhausted.

PROTECTION.

Winter protection of small fruit plants and bushes is a very important feature, and let me say that no iron-clad rules can be laid down for all soils and all seasons. It is a well-known fact that strawberries, raspberries, blackberries and grapes are often killed by injury from severe winters, occasioning great loss. It is not always necessary to protect strawberry plants. In all cases wait until the ground is frozen sufficiently hard to bear up a team and wagon before you cover, and then cover very lightly. If covered too deep they are liable to smother. Use rye straw, corn fodder, bagasse, broom cornstalks, marsh hay, or any thing of the kind. It makes but little difference what you use, provided you do not cover with mulch containing hay seed or weed seed. If you cover with straw you can remove part of the covering in the spring to the paths between beds, leaving only a thin layer over the plants

The covering of blackberries is quite different; you cannot let it go until you see whether they are likely to need it or not. If they are covered at all, it must be done before the ground is frozen much, as they are covered entirely with soil. This is an easy method. Of course the suckers must have been kept down and the ground well cultivated the summer before, and the bushes must be in hills about three by seven feet apart. Then two or three men, with potato or spading forks, begin at the north end of the row. The first man removes about two forkfuls of soil from the north side of the bush, then the second man, standing on the opposite side of the row, reaches across between the branches of the first and second bush with his fork and draws the first bush slightly to the north, and the first man inserts his fork into the soil the full length of the tines, about two inches south of the crown of the bush, and crowds the handle north until the bush lays almost flat. The most of the bending must be done in the roots, as the canes will not bend much without breaking. The first and second men draw the ends of the branches close together with their forks crossed, then one of them holds the bush in place with his fork and his foot while enough dirt is thrown on to hold it down; then they proceed to the next, laying it partly over the first and so on.

The cost of covering an acre of blackberries is from $8.00 to $10.00. I covered one and one-fourth acres this fall. It is more difficult to cover on clay soil. Red raspberries can be laid down more easily than blackberries, provided they are kept in hills; and

cap raspberries are harder to lay down than blackberries. They are all put down and covered in the same way. It is not necessary, as a rule, to remove soil from grapevines when laying them down. I cover all my grapevines with soil. I would not leave even Concord without covering, as I have tried it both ways.

PICKING AND MARKETING FRUIT.

C. U. GEETING, ROCK FALLS.

Picking and marketing fruit is one of the most important parts of the growers' business. It is a place where the raiser has a chance to advertise himself as no newspaper or local advertisement can do. There is always a demand for a good article put before the people, picked and marketed in the proper manner. Fruit must always have a clean, wholesome appearance; it must be neat and attractive, either in large or small quantities.

Never allow the appearances to be deceiving by putting the better or largest fruit on the top and an inferior article in the center; the detection is sure to come with the sale of the goods. I had one picker that brought in what we thought were nicer berries than the other pickers did. I asked the reason; she replied, "they ain't that way all the way through, you know you must cheat a little." Often in buying fruit you find out to your sorrow and loss that there are too many that cheat a little. In picking fruit of any kind it should be handled as little as possible. It is best to place it at once in the box or basket in which you intend to sell. This is particularly true of berries or small fruit.

I once sold to a commission agent who wanted me to point all my strawberries, that is turn all the stems down or underneath; the handling is very bad for the berries, causing them to shrink more than they otherwise would, while in my eyes the green caps to a strawberry go a long ways toward speaking for their freshness. Never send to market an inferior article and expect the highest market price for it. It is better to have two grades of the same article, and two prices to correspond, than to loose the sale of all by putting the good with the inferior and thus retard the sale.

Fruit should be in a proper condition when gathered, which the grower should perfectly understand; some fruit requires to be riper than others. There are a great many kinds that can be picked quite green in case you expect to ship them long distances. The measure should be well filled so as to allow for shipping and handling. Good measure brings its own reward. People are sure to choose a well filled box or basket. Have all well filled so there will be little choice. Never send to market what you would not be willing to go there and buy for yourself, and you will always please and be pleased.

THE COMMISSION MERCHANT AS AN ALLY OF THE FRUIT GROWER.

G. W. BARNETT, COMMISSION MERCHANT, CHICAGO.

Mr. President:

I know that in the minds of some, how many I cannot say, the mere announcement of the subject assigned to me will cause a smile of incredulity. The contrary idea has been fostered so long, and the changes on exploded charges rung so persistently, that many really believe the commission merchant is the natural enemy of the fruit grower, and only exists to destroy him. The thought is uppermost in the minds of these, that the handler of fruit is thoroughly dishonest and in league with the elements to defraud and despoil the toiler of his hard earned reward.

The fact is becoming pretty well recognized in this latter part of the nineteenth century, that a division of labor will bring the best results; that more can be accomplished by the intelligent use of facilities offered by others in certain lines of labor than can be obtained by the completion of the work by one pair of hands.

It will hardly be claimed, in this age, that the producer can market his own products to any advantage. Fancy the fruit grower going to market 50 to 250 miles to personally sell his fruit! His time is too valuable, and the machinery at his command too expensive to permit him to afford to do that. Away back in the 50's, before the system of selling on commission was introduced, one man brought peaches from Kentucky to Chicago in barrels, and sold them himself. One trip in three only proved successful, but the losses were so great that he gave it up. The next step was for men to go to Chicago and look up the man they desired to handle their goods and ship their product to him; and when Randall, and Scales, and Stanley, and Newhall transacted about all the business of Chicago in fruit commission, there was no thought of daily account sales with check for net proceeds, and settlements were made once a year, at the close of the season.

Time was when Alton, Ill., had about three weeks' monopoly of the Chicago market on tomatoes; when a third bushel box sold for $5.00, and for a week at $3.50, and when $1.25 was only a common price. But Union County soon became a competitor, and the terraced Piasa bluffs were no longer planted. In turn, Mississippi came into the market earlier than Illinois, and still has the cream of the early market, although Florida supplies us for months at a good figure.

On the line of the title of this paper, permit me to quote from the letter of the manager of a large shipping association in the west. He says: "We note your reports of sales for different days, and also the reports of————. We are also receiving reports from other cities, regarding the sale of fruit. One thing we desire

information about, and that is (sic) we have considerable trouble, unless by special maneuvering to get a report on any fruit sent from———— ————. Can you explain why this is so?..... One thing we fail to understand, why is it that————fruit sells so much cheaper, fully half less than that of————?" (A competing point.) ..... "Any advice and suggestions from you will be appreciated. While we do not desire our discouragements to be made public, we write the plain facts in the case, that you may give us some help, and the reason of the continuous poor prices for our fruit compared with others."

Here is an honest inquiry, and it received a plain, complete statement of the facts, and the reason of the comparative low prices, pointed out the remedy, suggest changes that in the light of experience would be necessary to success. The effort was appreciated, for the reply came: "We appreciate your efforts, and also your consideration shown, and you may rest assured that all matter thus written is greatly appreciated, and we will endeavor to use such information to our advantage." It is gratifying to receive such an acknowledgment; they come but seldom, and especially so when we know that the suggestions made saved that association $150 in the shipment of a single carload of fruit.

Take the average commission merchant in Chicago, and he receives fruit from a dozen different shippers. Constantly the supply changes, and into the same hands comes the fruit from the careful, experienced cultivator, expert packer, and careful business man, and the slovenly, ignorant, careless new beginner, who perhaps has had no chance to learn, and has but the crudest ideas about his business, but who imagines he knows it all. His commission merchant is the one to give him information, and suggest changes, but he would almost surely lose his trade if he did so, for his competitor would no doubt flatter the shipper a little—and get his business.

But not only is it in information, but in protecting the growers' interest in a financial way, is the merchant an ally. His interests are your interests. The higher the price, the greater the compensation, so that self interest and the instincts of honor unite to obtain the best possible returns. There is no real antagonism, there should be no friction between the two, and I am sure the more their relations are studied, the greater will be the feeling of friendship between the two.

The commission merchant is and can be the invaluable ally of the fruit grower, a saver of expense, of time and effort. For a consideration, he places at your command, the best markets, absolute security for your accounts, and ability, and trading power sharpened and improved by contact with the keenest traders in business. The trusting gardener cannot hope to compete with these men, who veritably live by their wits, but constant friction and contact with these is calculated to develop business talents of a high order, and these you can control

for the sale of your products. I know of no men with a wider view of the country at large, with better knowledge of coming supply, with greater practical estimate of probable demand, or more untiring energy in the pursuit of their business, than the fruit dealer. You give him the information from your section, others from theirs, and so on through the country, and collating the information, tabulating the figures gathered, he can act with confidence when you would be timid; would have a knowledge of supply and demand that you could not gain (and grow fruit), and this he places at your disposal.

The law makers have placed him in a most unenviable light, have hedged him about, have branded him as a half criminal in the legislation that appears on the statute books. They have raised up before him the shadow of the penitentiary, and have most unjustly discriminated against him, so that if you will use only ordinary common sense, you are safer in dealing with him and more secure in the certainiy of collecting your due, than if you dealt with your own country merchant.

I shall be pardoned for stating here that the National League of Commission Merchants has been organized, and now comprises one hundred and sixty firms in thirteen principal cities of the country, with an average capital of $44,000 each, ranging from $14,000 in the smaller cities to $65,000 in Chicago and $82,000 in Boston; so that now there is no excuse for anyone shipping to a weak firm financially.

Character is also taken into consideration, and each firm must maintain a clear record, or forfeit its membership. No claim is made that all the good firms are in the League, but I consider this organization the best ever effected for the protection of the shipper, and if the fruit grower will study carefully the foregoing I am sure he will find a strong combination in the fruit grower and commission merchant, who are members of the National League of Commission Merchants of the United States.

The law cannot put brains into your hand—but it has done for the fruit grower everything it could. Now let me say—have a due regard for your promises, look carefully after your own business in selecting a man to handle your products; consider that mankind as a whole is as honest as yourself; be honest with yourself and others, in all your dealings, and I assure you you will find a valuable ally of the fruit grower in the commission merchant.

A vote of thanks was tendered by the society to Mr. Barnett, of Chicago, and Mr. Coe, of Wisconsin, for their valuable papers.

By vote of the society Mr. Coe was made an honorary member.

The society then adopted the following resolution.

Resolved: That the Horticulture Society of Northern Illinois hereby endorse the principles and objects of the National League of Commission Merchants of the United States, as set forth in their declaration of principles and explained by its president, G. W. Barnett, of Chicago, and commend the movement to protect shippers in the consigning of fruit and produce for sale.

NOTES ABOUT THE APPLE TREE—1894.

DR. HENRY SHIMER, MT. CARROLL.

In the spring of 1892 there was an unprecedented exuberance of fruit blossoms, but the apple blight rust destroyed the crop in that warm, cloudy and rainy weather, and so injured the trees that blossom buds were not formed for the coming year. Hence there was no general apple blooming in 1893, and very little fruit. Two crops of apples were lost by that excessive development of the apple scab fungus in 1892.

The spring of 1894 gave us only a moderate apple blooming. Cold, frosty weather followed late in May, severe enough to cut down corn and tender vegetables, but it was dry. At this cold time the young apples were formed but not injured, the trees did not seem to be very fully set with fruit in June, but it was clear and dry weather, so that very little of it fell off. The fruit grew slowly during the very hot, dry weather of midsummer. The abundant rains of the latter part of August started the apples to growing very rapidly, and trees that seemed in summer-time to be thinly set with fruit were found later on to be too much loaded down with fair but small-sized apples. It was a great season for the apple cider mills, such as they very seldom realize. The fall apples rotted badly, hence many were made into cider that ordinarily might have been sold in the market or kept along for family use. Winter apples are not keeping well. I attribute this unusual tenderness to the wet fall weather and the late rapid growth of the fruit.

FIRE BLIGHT.

Dead blighted limbs appeared during the hot July weather as in the hot summers of long ago. It therefore appears probable that dry heat is the cause of what has always been pronounced "an unknown disease." I do not remember to have seen any of this fire blight in the rust blighting season of 1892.

APPLE BLIGHT RUST IN 1894.

I saw marks of this rust on the apple leaves, small, dusky, concave spots where the fungous spores had planted themselves in the few moist days of June, but the heat of summer soon dried up the little colonies of the fungus, the marks of their location on the leaves alone remained without any spores in midsummer and autumn. It is therefore a reasonable conclusion that there are not spores enough left over to do very much damage next year. There were some scab spots on susceptible varieties of apples, but not very troublesome, even the snow apple which takes the scab readily was fairly smooth.

The leaves of all apple trees were of a healthy, dark green color all summer, as nice a rich green as the foliage of the forest trees, quite in contrast with the somber, sooty hue of the apple foliage of 1893, so well marked in contrast to those of us who remember the color of the apple leaves in 1892. The wild crabapple trees were bright green and thrifty again, and produced nice plump crabapples as of old.

SPRAYING APPLE TREES.

If everybody had been stimulated through the loss of the apple crops of 1892 and 1893 on account of rust fungus, to spray their apple trees in the winter and spring of 1894, we all might have been convinced that the clear, bright green apple leaves, and the abundant fairly nice fruit of 1894 was in consequence of spraying.

What shall we think about it? Shall we conclude that spraying is not a valuable treatment for an apple orchard?

We never saw the grapes and grains freer of rusts than in the past season; grape leaves were cleaner, and it was late in the fall before the ground and rotten woods developed much coarse fungus. We will therefore rather conclude that 1894 was, on account of its unusual dryness, no fungus producing year. And we will continue to believe that spraying is useful in years favorable to the growth of fungus, when it is here to develop, but that we must learn to observe the times and seasons and to study the fungus when it is growing, so that, by seeing and knowing our enemy, we may know when and how to resist him.

THE INFLUENCE OF FLOWERS.

C. W. HART, MARENGO.

Mr. President:

Emerson says "that were the stars to shine but once in a thousand years, men would preserve for many generations the remembrance of the city of God which had been shown." Did no flowers brighten the world save once in a thousand years that supreme moment would be awaited with great anxiety, and happy, indeed, would be those who were fortunate enough to witness the blooming of the flowers. The privilege of witnessing such a sight would doubtless be handed down to posterity as the culmination of a man's life. As these new and rare beauties should be ushered into man's presence for the first time, his hopes would brighten, his bosom swell and his soul expand in sympathy with each fresh unfolding bud and he would alternately be filled with a feeling of awe or veneration.

If any one fails to see the beauty of a rose, the modesty of a violet, the purity of a lily, he must be among the number of those

who, having eyes, see not; his soul must be imprisoned by walls of adamant, so that he fails to hear the ennobling yet unpretentious instructions of the little flowers at his feet. The flowers are all around us, willing to teach us lessons of patience, kindness, purity, reverence and carefulness, if we will only condescend to open up a communication with them. A century is not too long for nature to spend in perfecting a good specimen, and she always does her very best. Young people this is a lesson for us. Be not in a hurry to achieve great results. We must prepare ourselves for our work. Our lives and our degree of success is measured by the amount of energy rightly expended. There is but one honest way of acquiring anything, that is to give an equivalent for what you receive. Anyone who is continually receiving but never giving is far from being a true man or woman.

We do not realize what nature has done for us, either because we do not recognize the power or recognizing we fail to comprehend it. The influence of a flower may be unnoticed at the time, but it is surely and silently doing its work with those who are willing and teachable listeners. If we cannot get into close sympathy and harmony with the laws of nature, flowers have neither a fascination nor an educative value for us. Anyone who studies carefully and intelligently a little flower as to life, growth, habits and structure cannot fail to be impressed with the fact that his life must be influenced and his character fashioned accordingly. If we search diligently for the truth we shall find it. We find wild flowers of the same species growing in practically the same kind of soil and having substantially the same habits. Here is a lesson that should be well taught at home. No one can become a Washington or a Wellington unless he grows in the same soil as they did. The creator has endowed man with reason, although it is often wonderfully perverted, that he might find congenial surroundings conducive to a good growth and thus bring forth his very best attributes. If a boy spends his time loafing on the streets, visiting saloons or gambing dens, or has no other motive in life than to be puffing at the end of a measly cigarette, he must not expect to be a Washington or a Wellington, for such soil does not contain the ingredients requisite for a high moral character and intellectual development.

Who says that flowers exert no influence? We sometimes confound noise with influence or power. They are as widely different in their natures as the heathen in the African jungles and the ideal citizen of the United States. The electric current traverses the wire unnoticed. But steam with all its hissing and sputtering cannot outdo its greatest competitor, electricity.

We cannot handle flowers and come into the presence of their sweet influence without being lifted to a higher plain of thought and living. As we look over a broad landscape, notice the great variety and profusion of flowers, see the harmonious blending of colors, we are made purer and nobler by being among them. Flowers were made

for me, for you. Then why not enjoy them. Surely it is more edifying to spent a few moments in their uncontaminated atmosphere than it is to spend weeks in a room filled with air made foul by those who have no higher concern in life than to kill time and spend a few miserable days here below. The influence of the two resorts have nothing in common; they are antithetical in their natures. The former is attractive, exalting and aids in the emancipation of the race; the latter is repulsive, degrading and seeks to enslave the race. One is a lesson of purity, freedom and civilization; the other of iniquity, thralldom and barbarism. Which will you choose? If one-fourth of the money that is spent in a thousand and one useless ways should be spent for flowers, both the buyer and the seller would be made happy.

The love of flowers is an indication of a more refined civilization. When flowers begin to be cherished and cultivated, at that moment a higher state of refinement is made manifest. If you see a home where the yard is ill kept, the weeds are permitted to grow and the yard itself has the appearance of a dumping ground, you need not look for refinement there.

On the other hand see a house that is well painted, the yard is covered with grass and here and there a few flower beds nicely arranged, there you will find refinement. Because the value of good influence cannot be measured in dollars many people have no regard for flowers, hence their esthetic natures are sadly dwarfed. Our authorities in large cities spare no pains to have parks nicely planted with flowers, so the people in the crowded tenement districts may have a place in which they may bathe in the sunshine, drink in the sweet scented air, which will drive away their cares and sorrows and cause them to forget the inconveniences and narrowness of their own little dark rooms where they are, by force of circumstances, obliged to spend the greater part of their days.

Flowers may represent the youth of our land, strong and full of health. Surely no one can spend his time among innocent children without being the better for it. So no one can spend time admiring the beauties of flowers and comprehending their many lessons without being freer in mind and soul. Flowers are of every possible description from the gigantic and gaudy ones of the tropical regions to the more modest one of the temperate zone, and gradually decreasing in size and brilliancy until we reach the mosses and lichens of the icy, cheerless polar regions, yet the same divine purpose is hidden in them all, namely, to minister to the want of man. It is a significant fact that those countries, in which the indigenous flowers are of the more modest types and scattered in the greatest abundance, are the countries that gave rise to the highest civilization.

Flowers are like a bashful neighbor, that is, it is difficult to make his acquaintance. Generally, the more familiar we become with our bashful neighbor the stronger the feeling of friendship. The very trait of character which we most admire in our bashful neighbor emanates from his modesty. The same is true of flowers. If we will only make ourselves conversant with them we shall find them affable and agreeable companions in the presence of which our lower natures will not exhibit themselves.

Emerson said he "much preferred the company of plow boys and tin peddlers to the silken and perfumed amity which only cele brates its days of encounter by frivolous rides in a curricle and dinners at the best tavern." With equal propriety may I say it is much more profitable for us to associate with the flowers, imbibing some of their sweetest, and purest lessons, which are inten ded to bring us nearer to the truth, than it is to spend our time in a room filled with foul and vitiated air and gormandizing ourselves with eatables. Flowers would have none of this. They are the greatest and cheapest physician on the earth. They gain their position both for their curative and preventive properties. Flowers purify the air by absorbing some of the noxious gases, thus rendering it life-supporting. Man is constantly exhaling material that would in a short time destroy all animal life were it not for the action of the flowers, and yet he often speaks of the poor little flowers as an object of contempt at which the shafts of his base sarcasm and vulgar wit are aimed.

Flowers develop the esthetic nature of a person. A boy whose esthetic nature is developed has no desire to tear down the beautiful terrace, dig holes in the lawn, break down trees, mar the furniture at home, or carve his name on and deface public buildings generally, for the marring of any object destroys its beautiful appearance. A love for flowers should be inculcated in the minds of every boy and girl. I do not mean such a love as a savage possesses. A love that cares only for the adornment of the person while the real beauties of the flower are unnoticed. I mean a love that loves the flowers for themselves and what they symbolize rather than the fact that a few flowers may be able to distract the attention of the public a few minutes from your bleared visage and homely physiognomy.

When we are fully impressed with the great beauties and wonders of flowers, instinctively our soul goes out to embrace the sweet perfume that seems sent to destroy all pestilential odors and dissipate our sorrows; then we become conscious of some invisible power fastening itself upon us, but for what purpose we know not. For a time we seemed to have undergone an apotheosis. Finally, the ego returns to its former state of consciousness and feels as if just awakened from a peaceful slumber, so free and tranquil is our mind. Such is the influence of flowers.

God might have made the earth bring forth
  Enough for great and small,
The oak-tree and the cedar-tree
  Without a flower at all.
We might have had enough
  For every want of ours,
For luxury, medicine, and toil,
  And yet have had no flowers.

Our outward life requires them not,
  Then wherefore had they birth?
To minister delight to man,
  And beautify the earth;
To comfort man, to whisper hope,
  Whene'er his faith is dim,
For whoso careth for the flowers
  Will care much more for Him.

At the suggestion of President Cotta, the first vice-president was made a member of the executive committee by vote of the society.

DELEGATE TO WISCONSIN MEETING.

H. R. Cotta was elected delegate to represent the society at the Wisconsin State meeting to be held at Madison next February.

OBITUARY.

ELMER BALDWIN.

It becomes the sad duty of your committee to record the absence, by final roll-call to "that bourne from whence no traveler returns," of one of the very earliest pioneers and fathers in Horticulture in this state, his last attendance being at Princeton last year. Although his days had long passed the allotted three score years and ten, the name of Elmer Baldwin of Farm Ridge is one that can be met among the very earliest of that list of pioneer horticulturists of this State that has helped to give it its enviable reputation in Horticulture. It seems meet therefore that the society make some record of the fact, therefore,

Resolved: That while bowing to the will of a wise Providence in taking away our fellow member and worker in the cause, we drop these words in reverence to his memory and bear record to his useful and beneficent life to his fellow men.

That a copy of these resolutions be spread on the records of the society and printed in the transactions, and a copy be sent to his bereaved family.

Edgar Sanders,
O W Barnard,
C. C. Miller,
} *Committee.*

LINCOLN PEAR—ORIGINAL TREE, Near Lincoln, Ill.
58 years old, 35 feet high, 5 feet in circumference.

[See Page 196.]

TRANSACTIONS

OF THE

TWENTY-FIRST ANNUAL MEETING

OF THE

HORTICULTURAL SOCIETY

OF

CENTRAL ILLINOIS.

Held in Lincoln, February 20, 21, 1894.

Next Annual Meeting at Champaign, January 3 and 4, 1895.

REPORTED BY

G. W. McCLUER, Secretary, Champaign.

CONSTITUTION AND BY-LAWS.

CONSTITUTION.

ARTICLE 1. This Association shall be known as the HORTICULTURAL SOCIETY OF CENTRAL ILLINOIS, and shall emb ace the counties of Adams, Brown, Cass Cham paign, Christian, Coles, DeWitt, Douglas, Edgar, Fulton, Ford, Iroquois, Hancock, Henderson, Knox, Logan, Livingston, McLean, McDonough, Mason, Marshall, Mercer, Menard, Morgan, Macon, Moultrie, Peoria, Pike, Piatt, Sangamon, Shelby, Schuyler, Scott, Stark, Vermilion, Tazewell, Warren and Woodford.

ART. 2. Its object shall be the advancement of the Science of Pomology and the Art of Horticulture.

ART. 3 The membership of the Society shall consist of members of all local Horticultural Societies in the district who have paid their annual fee of one dollar, also members of the State Society who attend meeting, and of all other persons, interested in Horticulture on the payment of an annual fee of one dollar, the wives and daughters of members, who shall be members without fee, and such honorary members as the Society may elect.

ART. 4. Its officers shall consist of a President, two Vice-Presidents, a Secretary, Treasurer and Executive Committee, which latter shall consist of the President, Vice-Presidents and Secretary, and shall hold their offices for one year, or until their successors are elected.

ART. 5. The Vice-President first elected shall be a member of the Executive Board of the State Horticultural Society.

ART. 6. This Constitution may be amended at any regular meeting by a two-thirds vote of the members present.

BY-LAWS.

1. The President shall preside at all meetings of the Society, call meetings of the Executive Committee, and, under its direction, have a general superintendence of the affairs of the Society, and direction of the expenditures of its money; he shall deliver an annual address upon some subject connected with Horticulture, and shall appoint all committees, unless otherwise ordered.

2. The Vice-Presidents, in the order of their appointment, shall act in case of the absence or disability of the President, and shall, by correspondence and personal intercourse with the horticulturists of their several localities, endeavor to organize local societies, obtain accurate information of the condition and progress of horticulture therein, and report annually, in writing, to the Society.

3. The Secretary shall record the proceedings of the Society, attend to its correspondence and prepare its reports for publication.

4. The Assistant Secretary shall assist the Secretary to record and prepare for publication the proceedings, and in his absence discharge the duties of his office.

5. The Treasurer shall receive and keep an accurate account of all moneys belonging to the Society, and disburse the same upon the written orders of the President and Secretary, which he shall retain and file as vouchers; he shall make an annual report to the Society of the receipts and disbursements, which, with the vouchers, shall be referred to the Executive Committee for settlement. Before entering upon his duties, he shall give a bond in the sum of five hundred dollars for their faithful performance, such bond to be approved by the Executive Committee.

6. The Executive Committee shall, subject to the direction of the Society, manage all its affairs.

7. The By-Laws may be altered at any meeting by a majority vote of the members present.

SOCIETY OF CENTRAL ILLINOIS.

OFFICERS FOR 1894.

PRESIDENT.....J. T. JOHNSON, Warsaw.

FIRST VICE-PRESIDENT.....C. G. WINN, Griggsville.

SECOND VICE-PRESIDENT.....L. E. VINEYARD, Lincoln.

THIRD VICE-PRESIDENT.....BENJ. BUCKMAN, Farmingdale.

SECRETARY.....G. W. McCLUER, Champaign.

TREASURER.....G. W. E. COOK, Lacon.

LIST OF MEMBERS

Atkins, S. F. ..... Lincoln
Augustine, H. ..... Normal
Bates, E. W. ..... Lincoln
Ballingslay, J. H. ..... Lincoln
Buckman, Benj. ..... Farmingdale
Clinton, G. P. ..... Champaign
Cook, G. W. E. ..... Lacon
Dunlap, H. M. ..... Savoy
Davis, E. R. ..... Lincoln
Eury, David. ..... Lincoln
Hinricksen, Sol. ..... Lincoln
Hobblett, Frank. ..... Lincoln
Johnson, J. T. ..... Warsaw
Jones, W. E. ..... Lincoln
Jones, J. W. ..... Lincoln
Longworth, A. ..... Clay City
McCluer, G. W. ..... Champaign
Nickelson, A. B. ..... Lincoln
Rautenberg, E. F. L. ..... Lincoln
Vineyard, L. E. ..... Lincoln
Wagner, F. M. ..... Lincoln
Winn, C. G. ..... Griggsville
Wyatt, Wm. A. ..... Lincoln

PROCEEDINGS

OF THE

TWENTY-FIRST ANNUAL MEETING

OF THE

HORTICULTURAL SOCIETY

OF

CENTRAL ILLINOIS.

TUESDAY MORNING.

The society met at the court-house at Lincoln, Illinois, February 20 and 21, 1894, President Jas. T. Johnson presiding. The meeting of the society was opened by prayer, by the Rev. Artz, of Lincoln.

ADDRESS OF WELCOME.

MAYOR HILL, LINCOLN.

Members of the Horticultural Society of Central Illinois:

In the name of our people, I extend to you a hearty welcome to our city. Our city was named for the great martyr President, and our county for the father of John A. Logan, and so this is historic ground. We have many things to be proud of that we would be glad to have you see and know about, from our manufacturing to our asylums and educational institutions, and while we cannot show you green lawns and trees in full leaf and bloom, as we could if it were a June day, instead of February, you as horticulturists will understand

the difference that the season makes. I should be glad to show our city when the roses are in bloom in June.

The interest which you gentlemen represent is a great and worthy one. I was born in Egypt. My father was a Methodist preacher and I used to go with him to camp meetings down there, and know something of the circumstances of the people there at that time. But things have changed there since then. The people have learned that their land is good for fruit, and in many parts, they are going from poverty, as a result of trying to grow grain, to almost opulence in growing fruit, and it is just such meetings as you are proposing to hold here that awaken people up to the importance of such things and get them out of the old ways of doing.

The address of welcome was responded to in a few well chosen remarks, by the president of the society, Jas. T. Johnson.

TREASURER'S REPORT.

GEO. W. E. COOK, Treasurer, in account with the Central Illinois Horticultural Society.

Feb. 17, 1893—To balance	$ 58 08		
" 17, 1893—To membership fees	5 00		
Sept. 30, 1893—To order from State Society	43 16		
Oct. 20, 1893—To order from State Auditor	500 00		
Total receipts			$606 24

EXPENDITURES.

Feb. 17, 1893—By order to Philip Dallam	$ 5 50		
" 17, 1893—By order to Union C. S. Co	10 40		
" 17, 1893—By order to Jas. T. Johnson	33 80		
Sept. 30, 1893—By order to C. G. Winn	43 16		
Dec. 10, 1893—By order to A. Bryant	133 16		
Feb. 17, 1893—P. O. Order	15		
Sept. 30, 1893—P. O. Order	50		
Dec. 10, 1893—Exchange	30		
		$226 97	
Feb. 20, 1894—Balance in treasury		379 27	
			$606 24

SECRETARY'S REPORT.

G. W. M CLUER, CHAMPAIGN.

The work of the Secretary has probably not been different from what it has been heretofore. It has consisted of preparing a part of the work of the last meeting for publication, keeping up a desul-

tory correspondence with other officers of the society, and with such persons as were asked to prepare papers for this meeting.

The expenses of the office have been:

For printing letterheads	$3.50
" " order books	2.25
" postage	2.20
Total	$7.95

There have so far been no receipts.

In looking over the membership of the Central Society, and of the State Society, from the central Illinois district, I find that there have been 147 different persons in the district who have been connected with the State or Central Society in the last five years. Most of the names appear but once. Taking the list of names of members of the Central Horticultural Society, as found in the twenty-second report, and comparing it with the twenty-sixth, it is found that there are only six names that appear in both. Taking the list as published in the twenty-sixth report, there are only twelve names out of the fifty-five that I could recognize as at all permanent. The rest are transients.

The membership of the State Society has come and gone in much the same way. In talking over its affairs with one of its most prominent members, he said that twelve or fifteen men constituted the constant working force of the society. The rest come and go, or if they remain, take but little part in directing or making the society's policy. It is natural that the leadership should be somewhat restricted, because not all are constituted for leading. But is the active interest in the society's affairs as general as it should be? or as it could be made? If it is not, what can be done to better the feeling of members toward their organization?

How many of the men, who may be considered as leaders of the society, know what interests the members have, and how best to supply what is wanted? We take it for granted that they want to know how to grow fruits, and from our programs it might look as if we took it for granted that they do not know. What interests have our members? Not many of them most likely are interested exclusively in fruit. Nearly all of them have general farming or some other business in connection.

I thought seriously, last summer, of preparing and sending out, to all who had recently become members of the society, a circular letter with a view of getting better acquainted with the men, and what they were doing. Lack of push, perhaps, more than anything

else, prevented. I still believe that if more information could be had, and a more friendly and intimate feeling worked up, it would be to the benefit of all.

Not only do we not know the man's wants and business, but very frequently not even the man himself. I may be a little slower than some others to form acquaintances, but I find it is not common for the transient members to become personally acquinted with the officers of the society, much less with each other. We usually have a time set aside for getting acquainted, but that is used by the older members for greeting each other, and the stranger at our door goes away a stranger still. While the society does not advertise the social feature as an inducement to meet together, it is one of the strongest attractions to the older members. New members are always welcome; but if they will stay with us and work, they will find themselves more welcome as old members than they can ever be as new ones.

What about the character of the material offered in our meetings? Can it be improved so as to be of more value? In talking to an agricultural editor, recently, he said there were very few papers read before horticultural societies that he could afford to publish in full and the reason given was, that they were, many of them, too long, not to the point, contained nothing of value, or were already old. Was the editor wrong or do we fail to bring up new and instructive material in good form? It may be doubted if the present plan of conducting the meetings is the best in all respects. For myself, I have been able to get more information, on points that I wanted to know about, by getting some one cornered and "pumping" him. I find, occasionally, a man with a secret, but he is the exception. There is some hesitation about asking questions in the open meeting, and it is not always easy to get at the source of the information you want, privately. I think that very often, if we could resolve ourselves into a series of committees with one member of each holding the information that the rest want, it would be to the advantage of all concerned.

I have not infrequently heard the missionary character of the work spoken of. Do the missionaries pay enough attention to their own advancement at these meetings? Are the papers to-day much higher in character or more advanced than they were ten or fifteen years ago?

THE PROPAGATION OF FRUITS FOR THE FARM.

H. AUGUSTINE, NORMAL.

It is possible for us as a State to produce better fruit, and more of it, than any other State in the union. Our situation, soil, climate—everything is in our favor; and yet we are not producing near what we should. We need missionaries to enthuse the farmers of our State in the cause of fruit growing, to show them the ease with which fruit can be grown, and to teach them its value after it is grown.

Of the farmers of central Illinois, not one in ten has a good succession of fruit. Most of them only have a few apples, many of them have absolutely nothing. This should not be; the farmer should be better supplied with fruit than any one else, because he can grow it for himself; but the fact is that, as a class, our farmers are more poorly supplied with fruits of varied kinds than the mechanics of the cities and towns.

People generally think there is a great mystery about the growth of many kinds of fruits, and that none but those on the inside can ever master it; that there is no use for any one not a professional to ever undertake to grow many things. Not infrequently, the tree man goes to the farmers' institutes and talks to the farmer about fruit growing, with the result that the farmer is more mystified than ever. I heard a fruit grower say once, that if the farmers went to raising fruit, it would drive the fruit growers out of business, and he gave that as a reason for not telling any of what he considered his secrets. But the fact is, we are not half supplied yet with all the fruit we ought to have in our homes. The more fruit there is grown, the more demand there will be for it, and the more remunerative fruit growing will become.

The propagation of fruit plants can be easily done by the farmer, with a little instruction and then care and the use of judgment on his part. Five dollars spent for plants will soon make a man all he wants, if carefully handled, and it won't be long until he will have some to give to his neighbors, too. I have grown 18,000 strawberry plants in one year from 200. Ninety from one. At that rate you would soon be overrun with them. All that is necessary is to plant out early, in good, well prepared soil, and keep them well cultivated. The runners will grow and do the rest.

Red raspberries and blackberries can be propagated by taking up the roots of the plants, cutting them into pieces, and planting them three to four inches deep, just as you would potatoes, only closer in the row. A piece of root of either of these a foot long is worth nearly as much for the farmer as a plant would be.

Grapes may be grown either from cuttings or from layers. If you are going to grow them from cuttings, take pieces of the new wood, in the fall, or early winter, a foot long, and put them away in a cool, moist place until spring. If they can be buried at the north side of a building, in the fall, and left till spring, they will be found nicely calloused over, and ready to make roots and grow when set out in the spring. They should be planted where they can be well cultivated. If you are going to grow them from layers, take a branch of new wood, in the middle of summer, dig a trench for it and put it in, covering all but the tip. It will root the same year, and may be taken off the next spring, but would be better if left another year.

If you will put aside a small patch for fruit, and give it good attention, you will not have another place on the farm that will be of half the value. But if you can not, or rather will not, give it the proper care, you had better let it alone and buy stale fruit.

Fruits are not luxuries, but necessities. Fruit makes home and home life more attractive, gives the farmer's family better health, and makes the young folks more contented and happier. No man on earth can live more independently than the farmer, if he has the conveniences. Boys leave the farm and go to town because they want the town attractions, and fruit is one of the great attractions to the farm that should counteract those of the town.

DISCUSSION.

Mr. Acken—It is better to plant good suckers, if they can be had, than root cuttings, because we save a year's time. Any person can be successful in growing fruits if proper attention is given it, but half way setting, and then neglect, will never give good results. People become discouraged because of their own carelessness. One acre of blackberries has yielded me $400 in three years. As the patch grows older, it needs more attention than a new one. The plants must not be allowed to grow too thick.

Mr. Dunlap—Having the right varieties to start with, and then giving them good cultivation, is what makes the difference between success and failure. Some varieties of plants resist disease better than others, and plants well cared for resist disease better than those poorly cared for.

TUESDAY AFTERNOON.

IRRIGATION IN ILLINOIS.

J. F. WALLACE, NEOGA.

Mr. President:

The idea has always seemed to be prevalent, that, in order to irrigate successfully, it is necessary to be a member of some corporation and that it requires the investment of a large amount of capital; or at least to be so situated that water can be obtained from some natural source. But from practical experience I am convinced that this is not at all necessary, and that there are but few farms in all our fertile prairies, where, by the exercise of intelligence and a goodly amount of muscle, this object can not be accomplished on a scale suitable to private individuals, with no very great outlay of money; and as summer drouths seem to be a constant condition, one acre thoroughly irrigated is worth more than five or sometimes ten by the old "trust to Providence" way.

During the past season, when none of my neighbors could raise a garden, I succeeded in supplying our home market with tomatoes which sold readily at 80 cents to $1.00 per bushel, and also in raising the finest celery I have ever seen grown in this part of the state, and that without rain enough to be of any benefit after the first of June.

At the last annual meeting of this society, an interesting paper was read by H. K. Vickroy of Normal, telling us how much water would be required for an acre of ground, its probable effect on the crop, and also how this water-supply could be obtained; so the most important things to be considered now are the natural requirements, the modes of application and the cost. As nearly all intelligent farmers and fruit growers, such as are supposed to compose a society like this, are well acquainted with the cost of tiling, I will only speak of the plans I have tested, and the grade or fall necessary.

My first venture, and the one I think by far the most successful if properly managed, is sub-irrigation or irrigation through tile. I selected a piece of land with a natural fall of one inch to the rod, and a place at the highest part where I could dig a well and construct a reservoir to hold the water collected from my neighbor's farm during the spring rains. I then began at an outlet sixty rods away and laid lines of four-inch tile about four rods apart and fourteen to sixteen inches deep, running to a shallow reservoir at the upper end, and so arranged that I could let the water into them at will; this

shallow reservoir to be filled by a pump, from a large well, fed by a deeper reservoir, when the water is needed. I then laid cross sections of three-inch tile (as near level as possible for drainage), and just deep enough to be out of danger from the plow. These sections, running almost from one main line of tile to the other, something like the rungs of a ladder, and one to two rods apart, act as feeders for drainage in wet weather, and distribute the water evenly when irrigation is needed. Of course this tile is all left open till I want to irrigate, and so gives me thorough drainage. When used for irrigation, I merely insert a piece of thin board, generally part of a cover for a berry case, between two joints of the tile at the point to be watered; driving it down tight it cuts off the flow. Then all I have to do is to turn in the water, and gravity does the rest. Care must be taken, however, not to have too much pressure at one point, or a washout will occur; this can be prevented by stopping the flow at any place.

I find that a fall of one-fourth of an inch to the rod is all that is necessary, and is even better than more where tile is used, as too much pressure is not wanted. By flooding these tile as described, the water will rise to the surface, thoroughly saturating the soil without causing it to bake, and its effects are plainly visible for a month in the dryest weather. The water can be turned on at any time in the day, as the surface will remain loose, and the sun will not affect it.

I have also tried running water in open furrows between the rows of vegetables or berries. This does not require so much water for an application and is easily done. The grade should be even and not less than two inches to the rod, to carry the water a great distance without injury to the part of the field nearest to the pump. In using this method, I find it best to open a deep furrow, fill it with water in the afternoon or evening, and if dry enough start the cultivator the next morning. The furrows should at least be filled with loose earth before they become baked, and should be about eight feet apart. The entire failure of the apple crop the last two seasons has so crippled my finances that I have been unable to carry out my plans, but I hope in the near future to make a more extensive test, for I am thoroughly convinced that money expended in this way will bring far more satisfactory returns than if invested in commercial fertilizers, or new wonders in the shape of plants, trees and seeds advertised so extensively to catch all our loose pennies. I would advise each member of this society to look over his own fields and see if he has not at least a few acres that nature has intended to be used in this way.

Our annual rainfall is always sufficient if properly distributed, and if we cannot get inexhaustible wells, we can collect water

during the rainy season to be used as needed. Some people are afraid to use water from a well without allowing it to become warm, but I have not seen the least injury from it to the tenderest plants, though my well is twenty-two feet deep. A larger tile might be used for the main lines, but the smaller ones are less liable to get broken so near the surface, and as they fit closer, are not so likely to be clogged with mud.

IRRIGATION.

H. L. DOAN, JACKSONVILLE.

Mr. President:

The estimates made by various authorities upon irrigation, as to the quantity of water needed, vary considerably. As a rule, the quantity used by some irrigators would seem extravagant. Thus we find standard authorities upon irrigation and practical irrigators recommending and using quantities varying from one to four quarts per second, flowing continuously for twenty-four hours, for each acre, at intervals of from five to fourteen days. It is evident, however, that the quantity of water needed to moisten the soil thoroughly depends on certain conditions which are variable. These conditions are: First, the nature of the soil. Second, the nature of the subsoil. Third, the character of the climate.

Soils differ greatly in their power to absorb and retain water. Those which absorb most water, retain it for the longest time. The power of absorption is due to the surface attraction of the particles of soil for water. The finer the particles of soil, the greater will be the amount of water absorbed, because the total surface of the particles is greater, and the longer will it be retained. Thus a soil consisting of coarse gravel will not retain water, while common arable land will absorb as high as 52 per cent by weight. In the experiment in which this was determined, the soil was thoroughly wetted to the point of saturation, and the increase of weight noted.

The greater capacity a soil possesses for absorption of water, the longer it retains it. It is obvious that upon this depends to a very great extent the quantity of water that will be needed for the irrigation of any particular soil.

The difference arising from the variation in the texture and composition of soils has been closely studied by the French irrigators and engineers. M. Gasparin, who stands at the head of the numerous writers upon this subject in that country, states that a soil which contains 20 per cent of sand, needs to be irrigated

but once in fifteen days; while under similar circumstances another soil which contains 80 per cent of sand should be irrigated once in five days.

It will be evident that much will depend upon the condition of the surface of the soil maintained by the cultivator. The amount of evaporation can largely be controlled by keeping the soil in a finely divided and mellow condition, in which it holds its moisture with the greatest tenacity.

Another French authority determines the limits of supply from one pint to two quarts per acre per second, continuously flowing for twenty-four hours.

Gardens require the larger extreme. In our own work we used three pints per second for one acre of strawberries. Gardens, by reason of the greater value of the crops raised in constant succession upon them, will permit the application of more costly methods of irrigation than other cultivated grounds; and, from their smaller area, there is less difficulty in procuring an ample supply of water. When the ground to be irrigated is of large extent, the tank room and water supply must be enlarged, or the power and the diameter of the pipe increased. The capacity of the pipe increases as the square of the diameter, by which is meant that if the diameter is doubled the capacity is quadrupled. Thus, if a pipe one inch in diameter supplies one quart per second, a pipe two inches in diameter will supply four quarts per second. At the same time the power must be increased in proportion to the amount of water elevated, or disappointment will result. In estimating power, a large allowance must be made for loss. You will lose about one-fourth of the power in friction, and where a stream of water is forced through a pipe of small dimensions for a considerable distance, the loss of power in friction is very large. For instance, in pumping by steam power 300 feet, we used fifteen pounds of steam, while to force the same amount of water a quarter of a mile, through the same sized pipe, thirty to forty pounds was necessary.

Our source of water supply is a pond with embankment on south and east sides, the other sides being formed by the natural slope of the ground. The outlet is in front along the east bank. The area of the pond is three-quarters of an acre, and its depth twelve feet. It is fed by springs and tile drain.

We have used the Dayton and Cam pump with a boiler of twelve horse-power. The suction pipe of the pump is two inches, and the discharge one and one-half inches. The boiler house is twelve feet from the pond. We have a pipe from the pump leading up to the highest point on the strawberry beds, and from that point pipes lead-

ing across the bed. These cross pipes have one-half inch plugs to let out the water. We open four of these at a time and let out the water on the beds, between the rows, controlling the flow on the ground with a hoe, and irrigate one acre per day.

After the strawberry crop is over, we pump one-quarter of a mile to the head of our blackberry patch, where we run the water in open furrows made by plow at head of rows, and water four rows at a time. In some places we made cross dams between the rows with the hoe to hold the water, as it ran off too fast by reason of the slope in the ground. This is easily and quickly done. We kept the water running all the time while the crop was ripening, and raised the finest crop of Snyder blackberries I ever saw—large, juicy and fine color. The ground, after irrigation, was too wet to walk on without rubber boots. The crop brought 20 and 25 cents on our market that year, being the only berries on the market. When the ground begins to dry after such a copious watering, it should be cultivated to prevent it from baking.

No one doubts the necessity of water to the growth of plants. Growing plants contain from 70 to 95 per cent of water. To the extent that water supplies this necessary constituent of a growing plant, it is an actual nutriment. The solid portions of the plant consist of matter which enters into it only while in solution in water. If water is not adequately supplied, an insufficient quantity of nutriment only will be carried into the circulation of the plant, and its growth will be stunted, or arrested altogether. The quantity of water that must pass through the roots of a plant of our ordinary farm crops and be transpired through the leaves to carry it from germination to maturity, is equal to a depth of twelve inches over the whole soil covered by the crop. This is the requirement of an average crop upon a moderately well cultivated soil. If the crop is stimulated to extraordinary growth by large applications of manure or other fertilizers, a still greater supply of water is needed to meet its demands. Thus the yield of a crop depends in certain cases entirely upon the amount of water supplied, and to a certain extent bears exact ratio with it.

The summer rainfall in our climate is rarely if ever sufficient for the requirements of a maximum crop. Our intense heat causes a large proportion of the rainfall to be evaporated directly from the soil. Our summer rains are seldom wholly retained by the soil, but escape into streams and water courses, and are lost to vegetation. Our fall, winter and early spring rains come at times when the crop derives little or no benefit from them. To estimate the amount of rainfall that thus escapes at three-quarters, would not be unreasonable. There would then be left less than twelve inches to meet the

necessities of growing crops. The supply of water then becomes the measure of the fertility of our soil, and our climate, subject to torrid drouths in the midst of the growing season, is the obstacle to success which meets the farmer and fruit grower, rather than the impoverished condition of the soil. To overcome this obstacle to successful cultivation, it is necessary that a system of irrigation be adopted. To irrigate economically and successfully, is a business which requires some knowledge and skill, and the expenditure of some capital.

Irrigation belongs to a highly advanced condition of agriculture, and can only be applied to lands of high value or capacity in the hands of intelligent owners.

DISCUSSION.

Mr. Dunlap—I am satisfied that the farmer might irrigate his kitchen garden with profit, by the use of a wind pump. There is a great difference in the palatability of vegetables grown rapidly where they have plenty of water and those grown more slowly during a season of drouth.

Mr. Augustine—Water is very valuable in the thorough ripening of the crop. A crop is sometimes entirely lost just at the time when it should ripen, because of lack of sufficient moisture to carry it on. I think I would prefer to have the water applied to the surface, rather than try to irrigate by tile.

Mr. Winn—The ideas expressed in these papers are excellent for the small fruit grower and gardener. I know a man in Chicago who thinks he made $1,000 per acre at an expense of $50 per acre in hauling water.

Mr. McCluer—If we had some feasible way of storing it, there is water enough going to waste here every year to irrigate the whole State. As it is we have a much better chance to irrigate here than there is in the west where it pays so well. There seems to be no reason why our fields, with a sufficient and timely water supply, should not produce as much as any in the United States.

THE FARMER'S ORCHARD.

BY C. G. WINN, GRIGGSVILLE.

Mr. President:

There seems to me nothing that a farmer can have around him that, from a standpoint of health, comfort, temperance, economy and necessity, is more essential than an orchard. But to find a farmer with an ideal orchard is the exception rather than the rule; not that farmers and their families do not like fruit, but that they do not plan ahead and set out the different varieties, or that when set out, the pressure of other farm work prevents their being taken care of after they are planted.

Usually the farmer is induced to buy what little fruit he does set out, by some sleek tongued tree agent with highly colored plates and higher sounding qualities; and I really believe that, if it were not for such smooth logic with high colored fruit plates, lots of persons never would set out fruit of any kind. Now, setting out fruit trees is all right and ought to be practiced more or less each year, but avoid agents from nurseries you know nothing about. Buy as near home as you can. There are numerous reliable firms in this State, and they are not hard to find. Join the Horticultural Society and get a volume of our transactions, and you can soon find a number of good ones.

I will just consider the use of fruit from the standpoint of health. Man is so constituted that he needs an acid of some kind in his stomach to aid in the digestion of his food, and regulation of the system. Fruit, especially the apple, will supply this better than anything else. Some use tobacco, others intoxicating drinks, narcotic and alcoholic stimulants to take the place of a well regulated system that fruit acids would give, and where either are used, very little fruit is craved. Who ever saw a man eat heartily of fruit and then go into a saloon and take a drink? or who ever saw a man who consumed some kind of fruit every day a confirmed drunkard? The truth is if he uses enough of the fruit, he will not crave either tobacco or liquor. I firmly believe that the best solution of our temperance question is to always give the children all the fruit they crave. Did you ever see a boy who would refuse to eat a delicious apple when he could get it? I never did. Now this statement about the value of fruit may seem to be too strong to some, but I will just call up one illustration. Take the men and their families in this State who are our most prominent horticulturists, and I think you will find that they are the most temperate set of men to be found anywhere outside of our ministers; and if you will include all denominations, I will not even except them.

As people are now all talking hard times, I will just allude to this tobacco and liquor question from a financial standpoint. Did it ever occur to you what the people are spending annually for these two

commodities? I have taken a good deal of pains to gather figures in my own county, where we only have three licensed towns out of twenty-four in the county. With drugstores everywhere; and I think it is a conservative estimate to say that there is annually spent in our county, for liquor, $100,000 and for tobacco over $200,000, or more than enough to pay our entire taxes each year, and I presume the showing in this county would be just as bad.

Now another thing from a health standpoint in favor of the apple. The North American practitioner says: "The apple contains a larger per cent of phosphorus than any other fruit or vegetable. The phosphorus is admirably adapted for renewing the essential matter of the brain and spinal column." Perhaps it was for this reason that the old Scandinavian tradition represented the apple as the food of the gods, who, when they found themselves to be growing feeble, and infirm, resorted to this fruit, thus renewing their mind and body. What would the farmer who has had in his own orchard and garden all the strawberries, raspberries, blackberries, gooseberries and currants, pears, peaches, cherries, plums and apples which his family could use the year round, take in dollars and cents and have them all removed and do without?

To tell how to manage all the small fruits would take too much time, though they are all necessary to a regular supply of fruit; so I will confine myself to the tree fruits.

The pear perhaps more than any other fruit can be grown in the lawn in front of the house, for the simple reason that in our rich soil it does not need cultivation more than two or three years. Blue grass can then be allowed to grow under it, as it needs a check to fruit well. All that appears to be necessary is to scatter a little lime and ashes around the trunk of the tree. As to varieties, the Bartlett and Seckel are perhaps as good as any for quality, but the Kieffer is better to fill up on, because it is a more regular bearer.

For cherries the Early May, Early Richmond and English Morillo are probably as good as any. They can be grown in a fence row if nothing better offers. The north side of the orchard is a good place.

The plum orchard should be in the chicken yard where the chickens can pick up the curculio that fall from the trees. For varieties, would suggest several. The Wild Goose, Abundance, Miner and Damson. The plum is rapidly coming to the front.

The peach is, to my notion, one of the best of our fruits, but is very uncertain; still it pays to plant them as two crops will pay for all trouble and expense. I think it best to have them in a sheltered place if possible. Localities differ so much that what is good one place might not be a success in another, but the Oldmixon, free and cling, Smock, Early York, and Heath Cling do well in our locality. By laying the peach tree in the fall, I think peaches can be had as far north as this almost any year.

Last, but the most important of all comes the apple. The location should be in as dry a place as can be found near the house, and if the ground is not naturally dry, it would be well to tile between the rows with not less than four-inch tile laid four to five feet deep; the apple cannot flourish with wet feet. Where it can be had I would prefer a windbreak of some kind. If I could have my ideal locality, it would be a high ridge, protected on the east, north and west. Even this will not always save the crop, but it is certainly a great help. As to varieties, for summer, Red Astrachan, Duchess and Benoni; for fall, Maiden's Blush and Snow; for early winter, Grimes' Golden and Jonathan; for late winter, for flavor, the Baldwin (if you can grow it), Roman Stem, Minkler, Willow Twig; and for fear all these fail, set out enough Ben Davis to do you, for they are probably the surest bearers, most prolific and the pie apple of the world.

Set the trees two rods apart each way, cultivate four to six years, with a corn crop, then sow to clover and hog it off. Do not let a blue grass sod capture your orchard, as the trees do not like that kind of a blanket mortgage on the ground they occupy. It takes too much moisture from the soil in a dry season, and will soon rob the trees of the elements they most need. When not in clover, sow the orchard to rye, or some other green crop, and plow it under.

Do not neglect pruning; prune so the sunlight can reach the fruit.

Spray two or three times each spring with London purple or Paris green, diluted to one pound to two hundred gallons of water.

In the fall, when gathering the apples, carefully pick out the best of the late keeping varieties, put them in barrels and keep in as cool a place as can be found (some out building preferred), until the weather gets cold; then place in the cellar, on their sides, and keep the temperature as near 35° as possible, and if you lay in enough you can have a generous supply of fruit all the year round, and be healthier, happier, more prosperous and live longer, and your posterity will call you blessed.

DISCUSSION.

Mr. Augustine—I believe that you want to keep the knife and saw out of the orchards. Trees that are pruned are not as healthy as those that are not pruned. Forest trees are more healthy than orchard trees on that account. People plant their trees too close. They should be planted far enough apart for the sunshine to get in among them.

Mr. Nicholson—It is my opinion that many trees are killed by cutting off large limbs. I have known whole orchards ruined by severe pruning.

Mr. Vineyard—I would condemn pruning altogether. Pruning causes excessive growth, and the wound leaves a place for decay to start.

Mr. Dunlap—I have pruned trees in different ways, but my opinion now is that the pruning practically should be confined to what is done the first two years. As the tree becomes older the smaller limbs will die out and should be removed. I would take out but few others. Trees should be set far enough apart so that they can reach their full development without crowding, say 30x30 feet.

Mr. Longworth—I am from Clay county, and have quite an extensive orchard there. Clay county is rapidly coming to the front as a fruit producing county. The assessor last year said there were 30,000 acres of apple trees. I head my trees low, from eighteen to twenty-four inches. I live in my orchard, and never go through it without finding something to cut off. But I do not cut off large limbs.

Mr. Buckman—If we want large fine apples, we must take out some of the inside limbs. Large apples cannot grow on a stunted branch any more than they can on a stunted tree.

Mr. Johnson—In pruning trees, the variety must control the kind and amount of cutting to be done. The Winesap makes lots of branches and needs more cutting than varieties like the Duchess or Maiden's Blush. The character of the soil, too, makes some difference. We should get perfectly thrifty, well grown trees, and then take good intelligent care of them. Excessive pruning is ruinous to an orchard. Entire neglect is just as bad.

Mr. Dunlap—What three varieties of sweet apples would you plant for central Illinois? For myself, I would select Golden Sweet for summer, Ramsdell for fall and Talman for winter. The market for sweet apples is not now fully supplied, and the demand is increasing. As the taste is educated, the people will want more and more of them.

Mr. Buckman—Ramsdell Sweet seems to be the same as English Sweet. Higby Sweet is one of the finest sweet apples in quality and appearance, ripening from October to January.

Mr. Winn—The apple is local in its adaptability. One part of Pike county is well suited to the Willow and another is not. The

Janet does no good in Pike county, but is excellent in Calhoun county. The Winesap is excellent in Massac, and some other counties in the extreme south of the State, but is of little value for central or northern Illinois.

Mr. Johnson—Similar things could be said of other varieties of apples. The Talman bears well in some places and not in others. The thing to do is to find out all you can about what has already done well in your own locality and plant those varieties that have done best.

Mr. Nicholson—What of the Montmorency cherry?

Mr. Vineyard—It is not of much value because it does not bear enough.

Mr. Augustine—There seems to be no cherry that is profitable in central Illinois, except Early Richmond and English Morillo. For profit I would plant nothing but Early Richmond, but if I was planting for myself I should plant half a dozen varieties, on account of variety and to get a longer season; but it must be understood that the additional varieties are for pleasure, and for the man who is looking principally for the dollars and cents, even the pleasure would be lacking.

Mr. Buckman—A variety sent me by Professor Budd, under the name of French Amarelle, is very promising. It is about twice as large as Early Richmond, not sour and yet not exactly sweet. The tree is distinguished among other cherries for its thrifty, upright handsome growth.

Mr. Braucher—I have bought the Downing Everbearing mulberry from different sources, and find it always inferior and of no value. Is the variety worthless, or do I get the real Downing?

Mr. Augustine—The Downing is really valuable if you get it true. The fruit is fine and large and borne in great abundance.

WEDNESDAY MORNING.

THE TREE AGENT.

H. AUGUSTINE, NORMAL.

Mr. President:

The subject assigned me is a hard one. I know you expect me to say some hard things, and it will not do to disappoint an audience; so let us get at the fellow and see who and what he his. Unless some one of the craft has chanced to drop in, I am sure this audience will unanimously assent to the statement. The professional tree peddler is the meanest man on earth. Possibly some might except the lightning rod agent or the professional well digger, but it is the tree man we are after.

The professional fits himself out with a book of high colored pictures, as large as he thinks his customers will swallow, locates himself in some country town, and starts out to sell trees.

He goes to farmer number one, compliments his farm, fine horses and the stock generally; or if talking to the lady of the house he comments on the good looks of the children, no matter how homely, cross-eyed or freckle-faced, and follows it up by saying, "what a perfect picture of their mother."

He touches the vanity of his customers by some kind of flattery, and then says he represents the nursery of A. B. or C. as their agent (if not one of the members of the firm), and of course it is the best and largest nursery in existence. They grow all their own stock, which requires the use of two or three thousand acres, and supply all the smaller nurseries from the refuse of their immense stock, after their own customers have culled out all the higher grades. The members of the firm stand so high in horticultural circles that the societies of other countries are governed by their great wisdom, etc., etc. In fact there is none other like them "In the heavens above or on the earth beneath," and this wonderful firm is devoting all its energies to propagating new varieties of fruit that will endure the most rigorous climate and produce the most luscious fruit in great abundance, with very little care. All this they do at great expense, solely for the benefit of their patrons.

While our agent is talking so eloquently about the rich, juicy, sweet fruits, our farmer almost imagines the rich juices running down from the corners of his mouth and the air filled with the aroma. He is reminded of the luscious peaches he used to eat in his boyhood days and regrets that we cannot grow such in this climate. Oh, but (says our tree peddler who is always ready for such an emergency) we have

overcome all that. We discovered a peach tree growing in Dakota, which we now call the Irene. By some coincidence, the seed of a very fine California peach was dropped by a government surveyor thirty years ago, by the side of a hard maple seed and the two grew up together, so that the peach root interlocked with the maple root, and by a mysterious freak of nature the peach partook of the hardy nature of the maple. To demonstrate this, he produces a piece of maple root, declaring it is the root of the peach just cut out of the nursery.

This tree will flourish when it is cold enough for the bottom to drop out of the thermometer. These trees are scarce yet and he is allowed to sell only two to each individual just to introduce them. But another year the firm expects to be able to fill orders for commercial orchards. However, since his customer is a very *influential* man in the neighborhood, he might spare him four trees at $5.00 each, provided he will give the firm a certificate as soon as the peach comes into bearing, which will be not later than the second year after it is planted. Of course the farmer wants to be up with the times, especially since he is the leading man in the neighborhood and there is a chance to have his name published in some widely circulated newspaper.

The good wife would like to have some blackberries, but the men folks have no time to pick them, and the thorns are so bad the women can't get among them. Here comes into play the ingenuity of the always alert tree peddler. He has just what she wants—a blackberry that is entirely thornless, exceedingly productive and is a wonderfully fine berry; and he produces a sample, magnified by the bottle it is in, of a large overgrown dewberry, which of course, he says, is a very small sample. These plants are a little expensive, because their firm is the only one having them, or knowing how to propagate them. But since the good wife has given him such a good dinner, the best he has had in a year, he will make a great reduction in the price and charge her only $15.00 a dozen, the regular price being $2.00 apiece. At last a good big order is signed, and our fine-haired gentleman bids the family good-bye with extravagant promises of what he will do when he returns to deliver the goods. He now goes to farmer number two, and a similar story produces a similar result.

A little later in the year we see this same tree peddler at some nursery figuring to get a lot of seedling peach trees to fill his orders. Budded trees at six to eight cents each are too expensive. From the canes of the blackberries he scrapes all the thorns so his fraud will not be detected until he gets his money. The stock is shipped and the farmer plants it. A year after when he finds his peach trees have all been killed by the first hard freeze, and the wife sees that the thorns have grown on the blackberries in the good old way, they write to this wonderful firm which was represented by this oily tree peddler, only to learn either that no such firm exists or they had no

representative in that part of the country, and know no such man. The farmer and his wife are left to wonder where their smooth tree peddler can be found.

This is not an overdrawn picture of what the professional tree peddler will do, and I doubt not that some of you have had a sadder experience than even this. But I am glad to say there are honest men selling trees who will give value received, though I am sorry to say they are not doing the major part of the selling. It is true that the larger part of the nursery stock planted is sold by men who will misrepresent, will substitute, in fact will stoop to almost anything to make a sale.

You, the farmers, are in a large measure to blame for this state of things. First, because if the tree peddler comes around and asks you to buy, and tells you the plain truth, and gives you the facts, you wont listen to him. He is out on expense and must sell, and unless he tells you some unreasonable story you turn a deaf ear to him and he concludes that Barnum was right when he said, "The American people want to be humbugged." You place the temptation before him, and many otherwise honest men are thus led to deceive. Another reason why you farmers and fruit growers are responsible for the dishonest tree peddler, is, you don't post yourselves in regard to Horticulture, so as to be able to know when the fellow is telling you the truth, and he makes you swallow what the average schoolboy ought to know is unreasonable.

Now, perhaps some of you will be shocked when I say that, in my judgement, even the tree peddler is a blessing in disguise. Yea, more. Some men declare they will not plant at all. Some say, "whose business is it if we don't plant?" I say, it is everybody's business. We are in a measure our brother's keeper, and surely no one who has a deed to any part of this beautiful country of ours can shift the responsibility of improving it and making it as productive as possible, especially in the line of luscious fruits so easily grown in our State. Imagine if you can the desolate and bleak condition of this great State without the trees and shrubs the tree peddler has scattered all over its prairies. It would be a sad picture indeed.

I hear some one say, "Why not send to the nursery and buy stock directly from the producer?" Echo answers,"Why not?" The fact is you don't do it. I believe all the stock purchased by the farmers in this State, direct from the nursery, could be grown on twenty acres of ground. I say again, but for the much cursed and abused tree peddler, there would be scarcely enough trees grown in our State to accomodate the birds of the air in building their nests.

Am I accused of encouraging the fraudulent practices of the tree peddler? Nay, verily, they are to be condemned the same as any other form of lying and rascality, and no one deplores this condition of things more than the man who grows the stock. How to get their

products to the planter in the best way, and especially how to protect the customer from these frauds, has been the perplexing problem with nurserymen all these years, for, mark you, the nurseryman is, in the minds of some, frequently held responsible and severely censured for these dishonest practices.

Let me say a word right here in defense of the often abused nurserymen. They are, as a rule, deeply interested in Horticulture and jealous of their good name, because, in the horticultural world, a good name counts for a great deal. They spend much time studying how to beautify this world of ours and how to improve its fruits, and thereby bless mankind. The true nurseryman is, in a large degree, an unsefilsh benefactor. Do you know that outside of the ministry there is no profession in which men are engaged that is composed of so uniformly clean, high-toned and moral a class as the nurserymen and fruit growers? In my acquaintance with several hundred nurserymen, I am not sure that a single one smokes or chews tobacco, or drinks whisky. We can only attribute this to the fact that they are engaged in developing nature and are thereby drawn toward nature's God.

The fact is, the tree man is among us as a necessary evil, and we must make the best of it until the planter is educated enough to bring about a different state of things. Until some radical change can be effected I would not legislate even against the professional, lest the tree planting, which is even now too meager, should be largely reduced. If even one-fourth of the trees planted should grow and do well, the planter has more than value received. Nothing pays so well as the planting of trees and fruits.

Suffer me, in conclusion, to make a few suggestions that may lead to better things. First, let the farmer thoroughly post himself on the subject of Horticulture. Let him know what to plant in his latitude. This cannot be done better and easier than by attending the County, District, and State horticultural meetings. Let the farmers organize institutes in every county and discuss horticultural as well as other interests. If possible, place in every farmer's home in the State a copy of the annual report of the State Horticultural Society.

Second, have it thoroughly understood that no new fruit shall be introduced without the endorsement of the State Horticultural Societies, after they have thoroughly investigated its merits by trial in their experiment stations, or otherwise, and are satisfied that it is worthy of a place. Third, let the nurseryman be more careful in getting out his catalogue, not advertise too many varieties, and in every possible way discourage the practice of fraud and deception, and the horticultural millennium will soon be at hand.

RASPBERRY CULTURE.

W. S. DYER, SPRINGFIELD.

Mr. President,

We have met here to discuss the best methods of planting and cultivating the different varieties of fruits, in which we all have a common interest. The raspberry, which is most neglected by the pen, is the great connecting link between the strawberry and the blackberry. It reaches out right and left, and makes one continuous fruit season for the grower, to cheer him on his way; for he has got to travel, and that lively, if he ever expects to make it pay.

The question with the new beginner, with the raspberry as with other fruits is, how shall I plant and cultivate them to make it profitable? There are certain conditions that must be complied with; first is the selection of a good piece of ground; the next is to select any good variety that does well in your locality, and that sells well on the market; third is thorough cultivation; fourth, the proper pruning, which is to be done at the right time.

The ground selected for growing raspberries ought to be light and rich, as the raspberry loves this kind of a home, and is better on a southeastern slope for early fruit, and a northern slope if late fruit is desired. For early varieties, I consider the Souhegan and Doolittle the best. For late, the Ohio and Gregg. In any case the ground must be rolling enough to carry the water off quickly, for if it is left to stand around the plants, the result will be a failure.

PREPARATION OF THE GROUND.

If you have your own plants, so that they can be allowed to stand until they are four or five inches high, before transplanting in the spring, I would advise putting the ground in rye the fall before and plowing it under when it has made a good growth. If you have to buy plants, I should turn under a good coat of barnyard manure in the fall, instead of sowing rye. To insure anything of a success the first season, the raspberries, especially if they are purchased from a distance, should be planted out as early in the spring as possible. If you have your own plants, it will be best to take up a good sized lump of dirt with each one, because the plants will be set out better, and will grow stronger. If you can plow under a heavy coat of rye, it takes it all summer to rot, and it supplies the young plants with enough moisture to keep them growing during the dry part of the season.

Plow deep, and harrow well; then take a two-horse marker and mark off the ground three feet apart. Then take a horse and diamond plow, and mark off the rows ten feet apart. Then select good even sized plants, as they will be more likely to grow up even and nice.

The above width is for greater convenience in taking care of the raspberries. The first two years, sweet potatoes, cabbage or sweet corn can be grown between the rows. This will pay the rent on the ground and for the care of the plants.

When the young plants are about four inches high, thin out to one cane in each hill. When the cane is about twelve inches high, pinch out the bud. This can be done with the thumb and finger, and will cause it to throw out laterals. No more trimming should be done until the next spring. Then cut the laterals back to about eight inches in length. The second year the young canes ought to be looked after when about four or five inches high, leaving only two of those starting out lowest down, in each hill. Remove and keep down all others during the season, using the cultivator and hoe freely for the destruction of weeds, and to keep the ground in good condition. Pinch back the young canes when about twenty inches high; this will make plenty of wood for the next season's fruiting. Always remove the old wood as soon as the fruit is off and burn it up. The following spring cut the laterals back to about twelve or fifteen inches in length, or as far back as the wood is dead, and burn it up. The third year the young plants ought to be handled the same as the second, except that three or four canes may be left in each hill; but in case the root is not strong enough, reduce the number until it is able to carry well what is left. Cultivate well each year. Give them a liberal supply of wood ashes in the spring; this gives color and vigor to the plants.

The red raspberry is not as hard to raise as the blackcaps, since they adapt themselves more readily to their situation. Anyone that has a rich piece of ground can grow red raspberries, if he will put the ground in good condition before setting out his plants, and then cultivate each season enough to keep down the weeds. Top the plants in the spring, remove the old wood as soon as the fruit is gathered, and keep the ground rich with some good fertilizer.

Another summer is past and gone, and the fruit grower is not overburdened with the proceeds of his fruit farm, but his hopes are strong in the future.

DISCUSSION.

MR. RAUTENBERG—Would the new canes be better or not to have the old ones cut out as soon as they are through bearing?

MR. BUCKMAN—After the canes have borne, they stop growing, and there seems to be no further advantage to be gained from them.

MR. AUGUSTINE—I believe the old wood serves as a protection to the new, and keeps the wind from whipping them about and injuring them.

Mr. Dunlap—Taking out the old wood exposes the new wood to the sun too much in summer, and to the winds and sun in winter. The injurious effect coming from exposure to the sun, is the main objection to taking out the old wood.

Mr. McCluer—Until a year ago we had made it a uniform practice to take out the old wood from blackberries and raspberries, but a year ago last summer a single row was left with the old wood in, for comparison, taking it out at the regular spring pruning. As a result the row, in which the old wood was left till spring, produced more fruit than the others. It is possible that the new wood may not only get protection, but some nourishment from the old though still living healthy wood.

BLACKBERRIES AND STRAWBERRIES FOR THE FARMER.

BENJ. BUCKMAN, FARMINGDALE.

Fellow Farmers—be they ladies or gentlemen:

One reason why these fruits should be raised by the farmer himself rather than bought, when both can often be purchased cheaper than raised, lies in the fact that, when one raises them himself, they are constantly on hand, and no digging down into the pocketbook (already too heavily drained) every time a person wants a fresh supply of these fruits; about how often, you all know how it is; we want them every day, and we want them, too, with all the sugar developed, fresh from the vines, rich, red, sweet, melting strawberries, and black—black—ready to drop blackberries, not the half-colored, sour things that shippers are obliged to have in order that the commission man shall not make the report—"soft," "mussy" or "spoiled;" but the genuine ripe article, with the wholly inexpressible flavor.

This taking the dimes and dollars from the pocket is a different thing, even if no more costly (but it is), from spending a little time in the berry patch occasionally, tending and gathering fruits for which language has no just description. What are the comparing words—honeyed, ambrosial, nectarial? As in former days "to be a Roman" was "greater than a king," so to be a strawberry or blackberry, is the highest round on the ladder of exquisite flavor.

I say "lady" as well as "gentlemen" farmers, because it is often the case that to the women of the farm the household is indebted for its supply of many of the vegetables and small fruits; and it is well thus, notwithstanding the American prejudice against women working

in the garden. It is this humdrum, monotonous thing of washing, cooking and sewing—washing, cooking and sewing, within the same four walls, day after day and year after year, that breaks constitutions, drives the rose from the cheeks, and sends so many farmers' wives to the insane asylum. If they have troubles they can tell them to the dishcloth. There is no shifting scenery to divirt their attention; their is no curative poultice of sunlight, nor elixir of fresh, pure air to heal up and invigorate the diseased parts.

Hired help should appear in the house as well as in the field, leaving time and strength for the enjoyable and healthy outdoor exercise, that is found in the flower garden, the kitchen garden, and the berry patch.

Now it is *so* easy to raise blackberries, that the only wonder is, that any farmer should consider it difficult. Let me prove it.

Get two hundred Snyder blackberry plants, costing $2.00. Plow in April, a deep furrow twenty rods long, in any fairly rich, well mellowed ground, place the plants in the furrow top end up, and nearly cover with the plow. Tramp around the plants and haul in a little more mellow dirt. At the same time, plant, every twenty feet in the row, some peach or other fast growing fruit trees, to shade the berries from the burning sun, and shade yourselves while picking. Train these trees somewhat fan-shaped along the row. Cultivate as with potatoes, but shallow, and without much ridging.

In fifteen months from planting, go out and see if the berries are mellow. Will your thumb and finger pinch through them easily? If so—taste them; Oh, they are good! Good for anything; the blues, the stomach, the temper; good for your friends who come to see you—and don't you forget it, they will come.

In after years, let the hired man, when he goes out to plow the field, pass along the sides of the row with the cultivators, and never let the row get more than two or three feet wide at the bottom. Keep most of the weeds out of the row, and the ground mellow with the hoe, if you have time.

Tip the young canes slightly with a butcher knife, when they get to be—say two or tree feet high. This will have to be done several times in the last of June and July, but a half hour at a time for six times only means three hours for the season. Cut out the dead canes in the winter with a hooked knife (that any blacksmith can make out of a flat file), in a long handle, and burn the brush. This will take three hours more. Don't manure for two or three years, and then give preference to rotted straw, bone dust and ashes, in place of heavy stable manure; but if the latter be used, do it sparingly.

Easy—isn't it? Now you have one more job, and it takes the most time of all. That is, to pick the berries and eat them. If you object to this job, don't plant.

There is a little more detail as to strawberries, and the crop is not quite so certain. I find that the most serious mistake of farmers is in thinking "a strawberry is a strawberry," without any regard to varieties. The fact is, most varieties are not worth planting. It is the same with other fruits. This is speaking comparatively. I admit that a wild crabapple is better than nothing, but we cannot afford to plant it when there is something better. So we had better start in right, remembering also that some very valuable kinds bear only female, or pistillate blossoms, and must be planted beside the perfect or hermaphrodite kinds, in order to bear fruit.

It is better also for the farmer to select a vigorous variety, one that can take care of itself pretty well, rather than the kind that is easily choked out by weeds, or starved and burned out by clods and drouth, no matter how well this variety may do in the hands of the expert.

Let us now plant the strawberry patch that shall hold 1,000 plants, costing, say $4.00, to the varieties—Crescent (pistillate), Bubach (pistillate), and Captain Jack (perfect flowered)—an equal number of each sort. Prepare moderately rich ground that is very free from weed seed, in the fall by plowing, pulverizing, and marking off very shallow one or both ways with a corn marker. Get your plants from the south, so you may have them in early spring, as soon as the ground is thawed, and dry enough to work well, the earlier the better.

It is extremely important to plant early in some seasons and no disadvantage in any, provided the soil is in proper condition to work. Put the plants into, say six rows, which are nearly four feet apart. While in the row the plants should be about half that distance from each other. Let the two rows of Captain Jack be in the middle. While planting, I keep the plants in a bucket of water, and plant by thrusting a spade into the ground, inserting the plant, and firming the soil with the feet; but any way by which the roots may be placed perpendicular, with the crown even with the surface of the ground (which must be firmly pressed against the roots), is all right. It is not necessary to spread the roots much. Frequent and shallow cultivation is necessary the first summer. The runners may be turned to vacant spots, and in severe drouth, dirt should be rather thrown on the plants than hoed away. At last the weeds will have to be pulled from the row by hand, as cultivation will injure the roots. You now see the importance of clean ground to begin with; a foul piece of ground is no more fit for strawberries than it is fit for seed onions. Now we are through with the patch until, say December, or when the ground is frozen hard, when at the rate of two or three tons to the acre, straw should be evenly spread over the patch, through

which the plants will force themselves in the spring if covering be not too thick, and it will not be if the straw is scattered evenly. Now you are ready for the finest berries you will ever have from this patch, and I hope and think that you will not feel that you have paid too dear for your whistle. You may eat your own fresh strawberries for a month or more, and can and preserve as many as you wish. But after you have picked berries all day, if on straightening up you find that your back and limbs ache, remember that I told you about this also. It's part of the program.

As soon as the first crop is gathered, split the rows in the middle with a plow, large or small, according to width of the row, turning under fully half of the plants. Harrow crosswise and lengthwise until the ground is again level, mow or pull away weeds that may come up, and mulch as before. It is best to plant a new patch every two or three years, as it is easier to plant than to keep an old patch reasonably free from grass and weeds.

DISCUSSION.

MR. AUGUSTINE—The blackberry is a shallow rooted plant, and so must have shallow culture. If we go deep, we cut off the roots and have practically a transplanted plant. A similar thing would be true of other plants. Shallow and frequent cultivation is best for all of them. In setting strawberries I prefer to plant by digging holes with a hoe, and want the roots well spread out.

MR. RAUTENBERG—I trim my blackberries repeatedly during the summer and have my rows roof shaped, and have had very good results.

MR. AUGUSTINE—Blackberries should not be pruned too often because it keeps the wood immature. We do not want too much bearing wood and want it rather low down.

MR. JOHNSON—Our success with crops is usually proportioned to the thoroughness with which we prepare the soil. If we make the best preparation for our fruits, we may be sure of success.

MR. MCCLUER—In setting out strawberry plants we seldom use either a spade or a hoe. We get the soil in first-rate condition by running along where the row is to be with a cultivator. The man then gets down on his knees and uses his hands entirely. When he gets used to it, he can put out the plants faster and better that way than the other.

Mr. Dunlap—Mr. Buckman recommends Crescent, Bubach and Captain Jack. What do others think of that list for central Illinois? I would like to add Warfield to his list of pistillates, and Sucker State for a fertilizer.

Mr. Rautenberg—What about the Parker Earle?

Mr. Buckman—It is very promising, but fails to perform.

CONCERNING PARASITIC FUNGI.

G. P. CLINTON, CHAMPAIGN.

Mr. President:

When one speaks of plants, or of the vegetable world, to the general listener it means only the common flowering plants that he sees growing about him. These, however, though the largest, the best known, and perhaps the most useful members of the vegetable kingdom, are not its only inhabitants; in fact they are far surpassed in numbers by other less conspicuous forms.

About these lower classes of algæ and fungi, most people know little. In fact it has been during the present century that scientists have chiefly gained a definite knowledge concerning them, for many are so small that they can be seen only by the aid of the microscope. Looking down its brass tube, under the influence of its carefully fashioned lenses, a new world is opened to our view—a world as wonderful, as curious, as beautiful as that we ordinarily see. The denizens of this microscopic land and sea perhaps have a greater influence on your purse, your health, or even your very existence, than you may realize.

WHAT ARE FUNGI?

Some examples of fungi are toadstools, mushrooms, puffballs, and those shelf-like excrescences that one sometimes sees growing on our forest trees. These, though the larger, more conspicuous members of the group, are not the most numerous. Do your oats smut? Your grains rust? Your apples scab? Your grapes rot? Those are diseases caused by fungi. Does your good wife's fruit mould? The milk sour? These are also conditions produced by our little plants. These fungi, however, are not all mischiefmakers, for we have among them our best friends. They fertilize your land; they make your vinegar; they serve as medicine; they flavor your wife's butter; they raise her bread. In fact, they help to make it possible for us to live upon this earth in the good style we do.

Technically speaking, fungi are the lowliest organized members of the vegetable kingdom, and present a structure very simple indeed when compared with flowering plants. We find in them nothing corresponding in appearance to the root, the stem, the leaf, or the flower. Being so simple in structure, they are necessarily of small size, usually microscopic. Another very important characteristic is their lack of chlorophyll, or that green coloring matter of leaves which enables them to change the moisture of the earth and the carbon dioxide of the air into food matter. The absence of this green coloring matter means that fungi must depend for food either upon dead or living animal and vegetable matter; and, as a general rule, they get their food entirely from one or the other of these two sources—dead or living organic matter. This method of obtaining food enables us to divide the fungi into two great groups—saprophytes and parasites, calling the former those that live upon dead animal or vegetable matter, and the latter those which steal their food directly from the living plant or animal which we term the "host." The parasitic fungi are perhaps of more interest to us because of the damage they may inflict upon our crops, our animals, or upon ourselves. They are the disease producer. Obtaining their food from living bodies, the damage is greater or less as the robbery is great or small, or as the products secreted by the parasite are detrimental or not to the welfare of the robbed. Most of these parasites occur on plants, and it is of such, as horticulturists, that you are chiefly interested. Let us spend a few moments, then, considering these vegetable parasites of vegetables.

While the parts or organs of a fungus in no way resemble in appearance such organs of a flowering plant as roots, stems, etc., still functionally they may be compared with such. We may define three parts in these fungi namely, spore, mycelium, haustorium—or the part concerned in perpetuating or reproducing the fungus; the part concerned in spreading it upon or through the infected plant; and the part concerned directly in robbing from the plant the food necessary for the development of the fungus.

It is a fundamental truth of every member of the vegetable or animal kingdom, that it tends to reproduce itself. In the flowering plants, we call this reproductive body the seed; in the fungi the spore. Structurally they differ much; functionally, they are the same. The spore is the much simpler body, just as the fungus is much simpler than the plant. Quite often the spore consists of but a single cell. Necessarily these bodies are quite small; yet they are of such varying shapes, sizes and combination of cells, that it is chiefly by them that the different species of fungi are recognized. Now, while in the flowering plant we find the seed-bearing part forming but little of the bulk of the plant, the reverse is usually true of a fungus. It is chiefly the mass of spores that we see in parasitic fungi; first, because the spores are the most conspicuous part of the fungus, because of their num-

bers; and second, because they are usually produced on the exterior of the plant, while the other parts of the fungus are generally formed entirely or partly inside. It is such beds or masses of spores that are seen in the red and black lines on the wheat that we call rust, the large sooty mass on the corn that we call smut, or the bright colored patches covering the underside of blackberry leaves that we know as orange rust. Perhaps you may get an idea of the size of these minute seeds, or properly speaking spores, if I say that it would take a thousand or more of those of the orange rust placed end to end to make a line an inch long, and two or three times that many of the spores of the corn smut. If I should wet a pinhead and plunge it into a mass of corn smut, it would take in the neighborhood of twenty thousand of these little spores just to cover its surface. Knowing how large the bunches of corn smut sometimes become, you may be able to imagine the immense number of spores that are produced in each. A single spore is sufficient to produce the fungus, if, in germinating, it can properly enter the plant. Is it any wonder then that these disease producers are so abundant at times? While all fungi may not be so prolific in their spore development, still they all produce an immense number of spores, because there are so many unfavorable conditions against their successful development. Another peculiarity about these is, that a single species of fungus may have two or more kinds of spores. This is something we do not find among flowering plants, as each plant has only one kind of seed. Take the rust of wheat, for instance. You know in early summer the rust is red, while in fall it is black. This is not because the rust has merely changed color, but is because in spring the rust is producing reddish colored spores in great numbers, which germinate readily and spread the disease over the wheat field. That is the function of these spores to spread the disease; so they do not live long, and we call them summer spores. Now the black rusts consists of an entirely different sort of spore made to stand unfavorable conditions of heat and moisture. Such are called winter spores, because they live over the winter before germinating, and then produce the fungus. Besides these two kinds of spores of the wheat rust, there is another spore stage that is developed on an entirely different plant, and all three spore stages belong to the one fungus. And this is true of many fungi that they have two or three or sometimes more spore forms that may be developed on the same or different plants. Take the orange rust of blackberry. It has two kinds of spores produced at different times, and these have until recently been considered as two entirely different fungi. Take the rot of grapes. By careful and long continued work botanists have found that there are four different kinds of spores belonging to this fungus. A great many, however, as yet, have but a single spore stage. Some of these are of such a nature as to suggest that some time we may be able to find other spore forms connected with them.

So much for the spore, or reproductive part of the fungus. Let us now consider the mycelium. The mycelium of the fungus has a function similar to that of the stem of the flowering plant. In appearance, however, nothing could be more different If you can imagine very small irregular, transparent or colored tubes or threads more or less branched, and with or without cross partitions dividing them up into joints, with the bore of the tube more or less filled with a transparent watery substance, which we call protoplasm, you can get something of an idea of how the mycelium part of a fungus looks under a microscope. In some fungi the mycelium is produced on the outside of the plant with the spores, as in apple scab, where it can be seen as small black lines on the scabby parts; or in mildew of grapes, forming with the spores the white powdery covering. As a rule, however, in the parasitic fungi, the mycelium is formed entirely within the infected plant, or host, and so cannot be seen save as we make very thin sections of the infected part of the plant and examine these under the microscope. In such cases we would find the fungous threads between the cells that go to make up the plant. These threads of the mycelium push their way between the cell walls forcing them apart, take advantage of any nook or corner not filled by the cells, and so weave their way through the tissues of the plant. Something of the diameter of these threads can be had when I say that they are usually considerably smaller than the cells of the plant between which they grow, and that these plant cells are themselves too small to be distinguished individually by the naked eye. In length, the fungous threads may be considerably longer than the plant cells. These mycelial threads may be variously limited in their distribution through a plant. They may be found merely in the locality which is evidently diseased, or they may be found throughout the plant, appearing in parts apparently healthy. Take the blackberry plant affected with orange rust, for instance. In this we can find the mycelium of the fungus all the way from the roots up through the canes into the leaves, where, on the lower surface by the production of the orange-colored patches of spores, is the only visible sign of the presence of the fungus. With the apple rust, on the other hand, the only parts of the plant that contain these threads are the small diseased spots that show on the leaves. In a case like the orange rust, where the mycelium spreads through the perennial part of the plant, it is likely to live year after year in the plant, and each season manifest itself by causing disease; but in such cases as the apple rust, where it is limited to the leaves, when they drop off the plant is free from the fungus, unless infected anew. The use of the mycelium is the same as the stem of the flowering plant. In the first place, it spreads the fungus through the infected plant. This enables the parasite to get food from a wider range, and so ensure a greater supply. Then it also serves as a means of carrying the food when obtained to the different parts where needed for growth. Lastly it serves

at the proper time, by modification of special parts, to give rise to the reproductive part of the fungus.

We come now to the consideration of the haustorium, or the part which was said to have a function somewhat similar to roots of our flowering plants. The mycelium we have seen is usually inside the plant it infests, but outside or between the cells that make up that plant. All of the food of the plant is stored up in the cells, and so long as the fungus is outside of them it gets no food from the plant. So one of the first things the mycelium does after it gets into a plant is to form short branches on different parts of its threads. These short tubes bore through the cell walls into the cells. Once inside they form a source by which food can be obtained, by absorbing through their delicate walls the food that the plant cells have stored for their own use. It is these branches that pierce into the cells that are called the haustoria. They form usually the least conspicuous part of the fungus, being really but branches of the mycelium, yet they are a most important part.

Thus we see that functionally we may compare the seed and the spore, the stem and the mycelium, the root and the haustorium. Is there not anything in the fungus whose office is the same as the leaf? The chief function of the leaf is, by means of its queer coloring matter, to change the inorganic elements of the soil and air into suitable substance to be used as plant food; that is, our ordinary plants are their own food formers. Now the fungi have no such green coloring matter, therefore cannot form their own food; so they do a much easier thing—they steal it from the plants they attack. That is why they have no part whose function is similar to that of the leaf.

Having considered these parts of a parasitic fungus let us see how it first enters its host, and the effect it produces. The fungus originates by the germination of the spore, just as the flowering plant is formed by the germination of the seed. Heat and moisture are favorable conditions in either case. The seed, however, selects the ground for the beginning of its growth; the spore, some external part of its host. Under favorable conditions, the spore begins its germination by the formation of a slight tube which proceeds from its side. Sometimes this tube produces secondary spores, which, germinating, produce other tubes that enter the host; or the original tube of the spore may enter directly into the plant. Once inside the plant, these tubes branch and increase so as to form the mycelium. The method of entering the plant is very different in various fungi. In some the tube of the germinating spore pierces directly through the epidermis of the plant. In others it gains entrance through wounded places. Others have it entering through very young or tender parts. The leaves of plants are protected by means of the epidermis, in which are numerous small pores that are opened or closed to regulate the amount of water given off by the plant. It is also through these openings that

the fungus may gain entrance in some cases. Usually, the leaves are the points of entrance of the fungus, as they are also generally the most diseased parts; but all parts, as roots, stems, leaves, flowers, fruit may be the point of first attack. It is a usual thing for each species of fungus to have a special way and a special point of attack. Another curious thing is that these fungi cannot attack plants indiscriminately, but each one has a limited list of plants that it can inhabit. Some plants are burdened more than others with the number of kinds of fungi that can attack them. For example, I find that on the apple, about a hundred different kinds of fungi have been found in the United States; while on the strawberry but a dozen or so have been reported.

The detrimental action of the fungus on its host is two-fold. In the first place, it steals the food that the plant has formed for its own use. In this way, it acts as a drain on the plant, which may or may not seriously affect it, depending on the demand of the fungus and the supply of the host. In the second place, the fungus, by secreting certain products that are injurious to the plant or by attacking directly the cell walls, brings about a diseased condition that is more or less serious according to the distribution of the fungus through the plant and the violence of its action. In these ways, certain fungi do great damage to their host; and, when this happens to be a plant of economic importance, the loss to man is frequently serious, especially when the point of attack is that part for which the plant is cultivated. Thus, in the smuts of oats and wheat, the destruction of the grain is direct, causing total loss; but in the rusts of the same plants, the loss is indirect, affecting the yield through diminished vigor of the plants and thus by the production of a less amount of grain. If one could estimate the loss that these parasites annually cause on all or even one of the different cultivated plants of this State, he would be surprised how great this is. Take wheat for example. It is a very common thing for five per cent to be totally destroyed by smut. This means a loss of about a million dollars every year to the farmers of this State. Quite often I have found ten to fifteen per cent smutted. This is merely the loss caused by one species of fungus. Besides the smut, our wheat is subject to attack by a stinking smut, three different kinds of rusts and a pink mildew, all of which may cause serious loss. So it is with the grape. The ordinary black rot takes from one to a hundred per cent of the crop. If the grape escapes this, its most vigorous foe, it may have the downy, or the powdery mildew, anthracnose, and one or two leaf blights with which to contend.

With all this destruction is it any wonder that scientific study of these disease producers is important? Is it not likely that scientific methods for prevention of such diseases should be of value? How can we overcome this waste? In the first place, it may be said that all measures for the treatment of plant diseases must be of the nature of a preventive, rather than of a curative process. You cannot doctor a

plant like you can an animal. What must be done is to prevent the disease, rather than cure it. There are four lines along which one can work on the preventive plan. The first is clean culture, which means giving the affected plant every possible favorable condition for its well development, and the destruction of all affected parts, thus rendering the number of spores less and so diminishing the consequent chance of infection. The second is rotation. In some diseases of root crops, the spores remain alive in the ground; and, with a badly infected field of plants one year, the chance for infection of a similar crop the next year is thus quite good. If, however, an entirely different kind of crop is planted in the field, no damage to this is likely to occur. The third method is selection. It is well known that certain varieties of some plants are less subject to certain diseases than are other varieties of the same plant. These varieties exempt from disease, if equally good, should be chosen. Selection of seed is also important. Seed taken from a badly infected crop is likely to have numerous spores attached, and these may be the source of infection. This is quite often the way the smut diseases are carried. Lastly, spraying may be given as a preventive treatment.

Spraying does not benefit plants already infected, save as it prevents more of the fungus from entering, for the fungous threads already in the plant will do their harm just the same as if the plants were not sprayed. This being the case, spraying must begin before any sign of the disease is manifested. The object of applying the fungicide in the form of a spray is to cover those parts of the plant, usually the leaves, through which the fungus gains entrance with a coating of minute drops of the liquid. The spray must be fine so that it will adhere to the plant. The use of the fungicide is to kill all the spores that are on the plant, and such as may be blown there while the spray adheres to it. When the water dries off, it leaves behind the solid part of the spray as a coating. It usually takes moisture for a spore to germinate, and the amount necessary to germinate the spore is sufficient to moisten this coating left on the plant, and thus to kill the germinating spore. In time, however, this coating left by the spray wears or is washed off from the plant. Then it is necessary that a second spraying should be given, and so repeated from time to time until danger from the germinating spores is over. It has been found that usually from two to five or six sprayings are necessary, according to the fungus or the severity of its attack. The epidermis of the leaves is to protect them from injury, and this usually can withstand the salts used in spraying when they will kill the spores of the fungus. Care, however, has to be used that the spray is not too strong for fear that it will burn the foliage, or not so weak that it will fail to kill the fungous spores. It has been found by experiments that copper salts possess these desired qualities (injury to the spore and not to the leaf)

to a pre-eminent degree. So fungicides having some one of these as its chief ingredient have been found to be the most useful. Perhaps, as the most efficient of all the different fungicides that have been tried may be mentioned, Bordeaux Mixture, Eau Celeste, and Ammoniacal Solution of Copper Carbonate. The first of these is most generally used, and as a spray for all fungous diseases seems to hold first rank. It proves, like other sprays, more beneficial in preventing some diseases, and some cases of the same disease, than it does in preventing other diseases, depending upon numerous conditions and modifying causes that we cannot always determine. Does spraying pay?

I answer by saying that it depends on the character of the disease you are combating, its probable severity, the importance of the crop you wish to save, and the intelligence displayed in using the fungicide. With the ordinary farmer who raises a little of all fruits, the destruction of any affecting him but little, spraying, save in special cases, will not play much of a part in his farm economy for many years to come; but with the horticulturist whose whole interest is bound up in immense orchards or plantations of special fruits, spraying has already come to stay, Such an one cannot afford even to run the risk of loss by those fungous diseases that sometimes sweep away his entire crop.

WEDNESDAY AFTERNOON.

THE SAND PLUM.

H. E. ROWLEY, LACON.

Mr. President:

Why they should have been called the Sand plum, I can only conjecture. Certainly not because they require a sandy soil, for on the contrary they attain their greatest size and perfection of fruit on soils best suited to other cultivated plums, which is exactly the reverse of sandy; that is clay or heavy loam.

The Sand Plum (*Prunus Angustifolia*) is a native of the western plains; particularly of the southwest. My attention was first attracted to it while traveling in Kansas and the Indian Territory in the autumn of 1884. There were at that time, innumerable clumps or patches of these plums scattered on the open prairie, occasionally one tree or rather bush in a place; more often half a dozen, but generally occupying one or two square rods of ground and averaging about three feet in height; rarely more than four feet. These patches were often miles apart, then again in close proximity. The bushes are found growing in all sorts of situations—on the banks of streams, in the beds of sub-

terranean streams in pure sand and water, on the sand hills, on the perpendicular sides of canons, and in the best of soils.

These sturdy little trees grow and annually produce their abundant crops of beautiful and delicious plums in all sizes, shapes and seasons of bearing, from early summer until the frosts of autumn. From the marvelous stories I had heard concerning them, and from their manner and habit of growth, I became deeply interested, and determined to test them in Illinois; being fully convinced that if they would succeed as well in our State as in their native habitat they would prove of great value. Accordingly the next spring, 1885, I dug a few small plants at random from two or three patches that had been burned over, wrapped them in damp buffalo grass, and mailed them to my home at Lacon.

Remaining in the west until late in the fall of 1887, I had every opportunity to observe these plums and during that time visited thousands of patches in bearing, and, wherever I could hear of any claimed to be particularly fine, made it a point to see them, note their location, and mark all of superior merit. Being called to Lacon, I found that the little bundle sent by mail had grown to thrifty bushes two to three feet in height, with wood so bright and smooth that I could scarcely recognize them as the same species seen in their native land. The next spring they bloomed profusely, and that summer nearly every bush was loaded to the ground with perfect plums. There proved to be three varieties; one, a small dark red plum, which ripened as early as July 1. One, bright crimson, oblong, medium size, ripened about August 1. The other, exquisitively marbled or mottled red, on yellow ground, with a white bloom, sweet and delicious in flavor, ripened about the middle of August. Not a mark of the curculio could be found, and all carried their fruit to perfect maturity. They presented a most beautiful and pleasing appearance. Under cultivation they were even more productive than when grown under natural conditions. My enthusiasm was aroused and I resolved to investigate these plums for all they were worth.

In the fall of 1888, I again visited the native home of these plums, and procured more than ten thousand plants from a radius of many miles in extent, and from as many different localities and patches as possible, in order to secure the greatest number of varieties. Among these was a small lot which had been described by a friend as the "best plum on the *creek*." The location of this patch was a carefully guarded secret, but as I was to take them to Illinois, I could have them. All the trees collected were cut back to about six inches from the collar, packed in boxes and shipped to Lacon, where I planted them in the spring of 1889.

The summer of 1891, nearly all produced a very heavy crop. My friend was right. In all my searching I had missed the prize. I had never seen any like these of his, either in leaf or fruit. The

foliage is of a lighter shade of green, broad and wavy, much like Newman, and in striking contrast to the narrow dark green leaves of all the others. The bark is of a much lighter gray, and in winter a very marked difference is plainly discernible. The fruit is superi r to any I had ever seen in size, quality and appearance. Form, slightly flattened, often with a distinct suture. Size, averaging mo e than an inch in diamater either way. Color, bright mottled red on yellow ground, and so thickly covered with a heavy blue bloom as to give the fruit a decidedly purplish appearance. Flavor, all that could be desired in a first-class plum; sweet, juicy, melting and delicious, with not the slightest trace of astringency. Season, first ripe July 15, and maturing in succession, they will hang on the trees fully a month after being well colored. It is larger and better than Newman, and nearly or quite as large as Wild Goose; enormously productive, and an annual cropper. Flowers, small, white and staminate or perfect.

In habit of growth it is the same as all the others, attaining, in the wild state, a height of three to four feet, and five to six feet under cultivation on strong soils; and herein lies its superiority over tall, heavy topped trees. Being a natural dwarf, they can be planted as closely as any of the bush small fruits without crowding. Mi e are three by six feet, and have as yet, plenty of room. Wind storms cannot break them down, nor can the fruit be blown from the trees. They withstand our hottest sun, the severest drouth, and coldest winters, without the slightest injury to foliage, fruit bud, or wood, and are much benefitted by thorough cultivation. They can be grown as cheaply, and much more profitably than gooseberries. They are not a slow, stunted grower, but rapidly shoot up to two or three feet, form myriads of fruit buds, and are ready for business. Such is the so-called Sand plum; a fruit in which I have confidence that when it becomes better known, will occupy a prominent place in the fruit garden. It will win its way to popular favor, through its sterling qualities.

I have christened my special prize "Rowley's Natural Dwarf Plum." And lest I should be accused of trying to wear out the Society's grindstone, I will say that I have no trees, buds or scions either to sell or give away.

I have endeavored to give you a plain statement of facts concerning these plums. The half has not been told, could not be in a paper of this kind, and should any of our horticultural friends desire to know more of them, you are cordially invited to visit my grounds, and judge of their merits when in bearing. They can then stand upon their good behavior, and plead their own cause.

FRUIT ON THE FARM.

HENRY M. DUNLAP, SAVOY.

Mr. President:

One of the principal advantages which the farmer may have over the city man is the opportunity of growing his own fruits and vegetables and having them on his table fresh at a very small outlay. He has the opportunity, but very often he goes without the fruits and vegetables from a failure on his part to take advantage of it. This happens too often and for an excuse the farmer will give something like "lack of time" or "there is too much to learn to be successful."

As to the first excuse, "lack of time," we might substitute "don't want to bother with such small matters when I have a corn crop to look after" as the real cause. Let me say to you that if you will give the little time necessary to the planting and care of small fruit for your home use you will be amply repaid for it in the health of your family and you will be able to live like a king with a very small outlay of cash. The same is true of time spent in the vegetable garden.

A great many farmers imagine that there is some mystery about growing fruit; that it requires special knowledge in order to be successful, and they are deterred from trying for that reason. They will say that neighbor so and so, or that they themselves, planted out a lot of small fruits and trees and in a very few years it was all gone, and therefore they conclude that it does not pay. Ten to one, if you will investigate you will find that the failure was caused by neglect of even ordinary cultivation. Let me assure you that there is no such thing as mystery about growing on the farm the ordinary fruits that have so much to do with making life there worth living. The secret of success is mainly in a proper selection of varieties and good cultivation at the right season.

The selection of varieties is a very important matter, for if we do not start right in this we are very liable to disappointment, even if we give the best of care afterward. In the planting of tree fruits this is especially important; for in that case we not only lose the work but, what is of more consequence, several year's time, if we do not get good varieties to start with. The man with the everbearing raspberry, the bush strawberry, the evergreen blackberry, the never blighting pear tree, the hardy Russian and whole root apple trees is to be avoided by all means. He will have other catches, but if you will use your reason he will not hook you.

Don't make the mistake of buying a thing because it is new and you think you are going to get ahead of your neighbor. The fashion in fruits, unlike that in bonnets, does not change. If the variety

proves a success it stays until some other, after careful investigation and trial, proves to be better. If being a new variety is all that is claimed for it by the agent, remember that in one or two years at the farthest, it will be sold as cheaply as the so-called old varieties. Stick to the best of the old and well tried and you will not go far wrong.

If the farmer will devote one acre of land to an orchard and small fruit, well selected and well cultivated, he will never, after a fair test of the matter, say it does not pay; neither will he go back again to the old regime of "hog and hominy" that in all probability obtained before he tried the experiment. The farmer who fails to take advantage of his opportunity in this line fails to appreciate the advantages of a life upon the farm and ought to move at once to a coal mining town and go to work in the mines. The grass, the trees, the vegetables of the garden, the fruits of the orchard and the sunshine are wasted upon him unless he can figure out their value in dollars and cents. The almighty dollar to such a man obscures the sun and he persists in standing in his own light in such matters as pertain to the comfort of his family. Believing that salt pork and potatoes are "more fillin" he has no time to waste upon the fruit and vegetable garden. When the children get sick upon such diet as he provides, he has recourse to the bottle of patent medicine, and when they are attracted toward the city, he wonders why it is they want to leave the farm.

But I do not need to tell a body of horticulturists about the value of fruit upon the farm, though you are no doubt acquainted with some neighbor who does need talking to and when we call him to mind we can better appreciate the importance of the subject. We will therefore take a few minutes upon the different kinds of fruit and the main points in their management.

Strawberries are as easily raised as cabbages. Set the plants in well prepared soil and give them as much care as you would a lot of cabbages that you wish to do well. In the early winter after the ground freezes, cover lightly (about one inch) with prairie hay or straw from which the chaff has been sifted with the fork so as to remove the seeds. This is for the first year. The second year and also the third, after the crop of fruit has been removed, run the cultivator through the patch plowing out all except a narrow row, and if convenient to do so run the harrow over the ground after the cultivator. Cultivate until the first of August in this way and then leave the plants to make runners for the next season's fruit.

Raspberries come in as soon as strawberries are gone and you should have them by all means; and as blackberries come immediatedly after the raspberries in season and require the same treat-

ment, I will mention them together. Set the young plants in the spring and cultivate the same as you would corn or potatoes during that and the following seasons; for they need to be cultivated to obtain the best results. The fruit is always borne on the wood of the previous season's growth, the old wood dying out each year. So young wood growing this year needs attention in order to be successful next. The young shoots that come up from the root should be pinched or cut back during the month of June to a height of two feet. If this is done the canes will branch and become much stockier and will bear much more abundantly. Red raspberries, however, should not be cut back but should be kept in hills with the hoe and cultivated the same as the black.

Currants may be started from cuttings, and, with gooseberries are easily grown. The worms that eat the leaves of the currant and gooseberry may be destroyed by dusting the plants with hellebore when the worms first make their appearance.

Grapes are as easily grown as any kind of fruit, and if a careful selection of varieties is made we can have them from the middle of August to the middle of October.

Apples should be planted not less than thirty feet apart each way. This will give fifty trees to the acre. Small fruit can be grown in the orchard while the trees are young, and as the apple trees need cultivation, the small fruit can be set in rows about eight feet apart. Try to interest the younger members of the family in growing the small fruits as well as in the care of the garden. You will be surprised how much interest they will take if their efforts are rightly directed and the work is not allowed to be neglected. You are well aware that you take a greater interest in an animal on your farm that is in fine condition than you do in one that winters on the strawstack and shelters behind the fence. You will be surprised how much interest you yourself will take in a well cultivated fruit garden. You will even take your neighbor in to see it when he comes to see you. A well cultivated garden in a neighborhood is an incentive to all who see it to go and do likewise.

In conclusion allow me to say that the list of varieties of fruits recommended in the fore part of this volume is a good one. However, if there is something else in your vicinity that does well that is the one for you to plant.

ABOUT YOUNG TREES.

G. W. MCCLUER, CHAMPAIGN.

Mr. President:

The subject of the young orchard and its management has very often been discussed before the Horticultural Society, but while it seems to me as important, the tree, from the time the graft is made till it takes its place in the orchard has not come in for its share. The tree's care, the manner of its existence and its development in the nursery is as important as any other part of its life. It is in the nursery that the tree gets the start which is largely to determine whether it is to be of much or little value in the orchard.

I shall only speak of apple trees, but the principle would, in general, be the same whether it is the apple or some other kind of tree that we are considering.

In the propagation of the apple, two methods are commonly used, root grafting and budding. Root grafting as it is generally practiced consists of taking a piece of a one-year old apple root three to four inches long and a scion five to six inches long and splicing them together. This is done some time during the winter and the grafts, as they are called, are then put away where they are kept cool and moist, until the root and scion are grown together and it is time to plant them out in the nursery. For the purposes of the nurserymen, root grafting may be considered as divided into whole-root and piece-root. The advocates of the former do not actually use the whole of the root in grafting, but only the upper part of it, five to six inches long. A well grown seedling apple tree one year old has a root from one and one-half to two feet long, so that only a third or a fourth is really used.

The same men who grow whole-root trees also grow piece-root trees, and for this they cut the lower part of the root into pieces two or three inches long. In their arguments in favor of whole roots, they say that the collar is the natural place for the stock and scion to unite, as though there was really a place where nature intended that the top she gave the tree should be cut off and a new one of the nurseryman's chosing put on instead.

The advantage that a whole-root tree has over a piece-root tree is as yet only theoretical. The character of the root of trees for transplanting is as essential as that of the top; and any method of management that will give good roots is important. From our experience it seems that a long piece of root is preferable to a short one, because it produces a tree whose roots are likely to be more branching. Mr. Stark says that "the best roots for whole-root trees are such as are well branched," and the reason is (though he does not say so) that

they already have the start for the most desirable form. The char acter of a tree's roots seems to be governed in part by the variety and in part by the root it is grafted on. There is some variation in the character of the roots of seedling trees of the same species, just as there is in the top; and the root will continue to hold at least some of its characters after grafting. This is the reason why the "well branched roots are the best for whole-root trees," and for the same reason they would be best for piece-root trees too.

Many men lose their trees through neglect or carelessness and this gives the agent a good chance to come around and tell his story of the advantages of trees budded, or on whole roots. The agent with the budded tree tells of the "black heart" of the grafted tree and the decay that will necessarilly come from it; and his cure is to plant only budded trees. But the same cause that produces disease in the grafted tree will also produce it in the budded tree. Black heart and decay are much more likely to come from improper care during growth than from the method of propagation. If the tree can be kept in good healthy condition from the first, and is so treated that the season's growth will be properly ripened before winter sets in, there will be no trouble about the bug-bear, black heart, that agents have used to such good advantage. But if the trees are neglected, insects allowed to strip them of their leaves, or the root louse is allowed to accumulate on them, and they do not ripen up well in the fall, a severe winter will make either the budded or grafted tree diseased, and in that case neither should be planted.

I saw, last summer, several nurseries in which most of the trees were either bare or had only the brown skeletons of leaves. Trees in such a condition cannot be in geod health and are just as liable to suffer from a severe winter as animals would be that had been kept poor all summer by vermin or disease. Neither budding nor whole roots can save a tree from the consequences of such neglect. In examining a number of old trees, I have not yet found one in which decay had started from the point where it had been grafted.

There is as much difference in value between vigorous and stunted trees for the orchard, as there is between vigorous, healthy young animals and diseased or stunted ones for feeding purposes, and I sometimes think there is more. We purchased some trees two years ago that were very poor, and with the best attention we have been able to give them they are poor trees yet. An extra good lot of trees bought a year earlier and having the same care since are making an excellent growth. We will dig out the poor trees because they do not seem to be worth keeping.

"Where shall I buy trees?" is a question that I am often asked, and one that it is a hard matter to answer satisfactorily. If one man grew uniformily good trees, and another poor ones, there would be no hesitation. A common reply to the question is to buy as near home as

possible, and I believe that, other things being equal, that is the best thing to do. There is no direct experiment to show that the trees of the home nursery are either better or worse for the planter than trees of the same grade and subject to the same exposure, from a distance. One advantage, and it seems to me the only one worth considering, is that the trees from the home nursery may be taken up and transplanted with less exposure to the roots than those from the more distant place.

The conditions of soil and climate that will produce a good tree in one place are not so very different from those that are required to produce a good tree in another place. So, in many cases there is no more change in moving trees a thousand miles than might be found in a move of one mile. There seems to be some localities that are specially adapted to growing good, strong, vigorous young trees, and I believe that if you are to send away at all, it would be best to send to just such places. But a place that was at one time noted for tree growing, may, from the multiplication of insects and from other causes, cease to produce more than the very poorest ones.

Trees must be exhausted to some extent by being out of the ground for a long time. As they are usually stored in tree cellars, the roots are more or less exposed to the air and dried, and it takes them longer to heal over and start into growth after a winter in the cellar than it does if they are dug and at once planted out again. As trees are packed for shipment, the exposure in transit is much less in going a thousand miles than it would be if they were hauled five miles in an open wagon.

As a general rule, the best time to buy trees is in the fall, and the best time to set them is in the spring. There are several reasons. In buying trees in the fall you can give them such care that they will be ready to start into growth at once when planted out. As soon as the trees are taken home they should be well healed in. Dig a deep trench east and west. Lay the trees in this with the tops toward the south, and cover the roots as carefully as if the trees were being planted. About half the tops should be covered too. In this way the trees will be kept fresh and the roots will heal over, and by the time the ground is fit for planting in the spring, many of them will have made new roots two or three inches long. If the roots were the only thing to be considered, I would recommend planting in the fall so as to take full advantage of their new growth; but the tree as a whole is not as hardy after it has been dug and transplanted as it was before, and the thorough heeling in furnishes a much needed protection. Some trees that can be very successfully transplanted in the spring are very apt to die if planted in the fall, because of their lessened vitality. This would be more specially noticeable in trees that are only partly hardy at best, as the peach and redbud.

If the trees are bought at the home nursery, it is generally possible to make a better selection in the fall than can be done in the spring, because there will be more trees to select from, and because neither the buyer or seller will care to take much time to select during the rush of spring work.

The ground is generally in better condition for planting in the spring than in the fall. If the tree is put into dry ground, the soil will absorb moisture from the tree rather than the tree from the soil, and as the tree constantly gives off some moisture to the air even in winter, it is liable to injury from that which it would in part escape if well heeled in.

TRANSACTIONS

OF THE

TWENTY-SECOND ANNUAL MEETING

OF THE

HORTICULTURAL SOCIETY

OF

CENTRAL ILLINOIS.

Held in Champaign, January 3 and 4, 1895.

REPORTED BY

G. W. McCLUER, Secretary, Champaign.

OFFICERS FOR 1895.

PRESIDENT.....HENRY AUGUSTINE, Normal.

FIRST VICE-PRESIDENT.....C. G. WINN, Griggsville.

SECOND VICE-PRESIDENT.....L. E. VINEYARD, Lincoln.

SECRETARY AND TREASURER.....G. W. McCLUER, Champaign.

MEMBERS OF THE SOCIETY FOR 1895.

Augustine, H.....Normal
Beiser, F. A.....Champaign.
Burrill, T. J.....Urbana.
Busey, J. F.....Champaign.
Clinton, G. P.....Urbana.
Dewey, M. A.....Urbana.
Dunlap, H. M.....Savoy.
Ehler, G.....Champaign.
Genung, Z. R.....Rantoul,
Hall, J. S.....Urbana.
Haines, Charles A.....Champaign.
Hollensbe, A. O.....Champaign.
Hossack, J. A.....Champaign.
Hubbard, L. G.....Urbana,
Johnson, J. T.....Warsaw.
Kerr, J. L.....Urbana.
Love, J. M.....Philo.
McCluer, G. W.....Champaign.
Morris, H. M.....Rantoul.
Nicholson, A. B.....Lincoln.
Raymond, I. S.....Sidney,
Roughton, Jno.....Rantoul.
Vineyard, L. E.....Lincoln.
Winn, C. G.....Griggsville.

PROCEEDINGS

OF THE

TWENTY-SECOND ANNUAL MEETING

OF THE

Horticultural Society of Central Illinois,

HELD IN

Champaign, January 3 and 4, 1895.

The meeting of the Society was called to order at 1:30 o'clock, January 3, by the President, James T. Johnson, and without any preliminary formality the regular order of the program was taken up. The local attendance was quite large.

REPORT OF THE TREASURER.

GEO. W. E. COOK, Lacon.

RECEIPTS.

Feb. 20, 1894—To balance from last report		$379 27	
To membership fees		18 00	
			$397 27

EXPENDITURES.

Feb. 20, 1894—Paid Printing Co.	Warrant No. 2	$ 9 75	
" —Paid G. W. McCluer	Warrant No. 3	9 37	
" —Paid H. Augustine	Warrant No. 4	5 30	
" —Paid J. T. Johnson	Warrant No. 5	4 64	
" —Paid C. G. Winn	Warrant No. 6	5 25	
" —Paid G. P. Clinton	Warrant No. 7	5 89	
" —Paid G. W. McCluer	Warrant No. 8	7 15	
" —Paid G. W. McCluer	Warrant No. 9	25 00	
			$ 72 35
Jan. 3, 1895—Balance on hand			$324 92

REPORT OF THE SECRETARY.

G. W. MCCLUER, CHAMPAIGN.

Mr. President:

Since the last report of the secretary orders have been drawn, Nos. 2 to 9 inclusive, which agree with the treasurer's report, and are omitted here.

I have had notice two or three times since the close of the World's Fair that the Horticultural Society of Central Illinois had been awarded a diploma on its exhibit of varieties of winter apples. There is a promise each time that the diploma will soon be forwarded, but it has not yet been received.

The reports which our society helps to make are supposed to be of permanent value, and as such, are bound up in book form. The ordinary farm paper is printed largely for the time, and to keep up with the times; to give what is new or novel to-day, but which on sifting, may prove not to be new, and in many cases not of value. For an article to be published in book form, more length may be allowed, if more length is needed to reach the point, than could be allowed for a newspaper publication. It has seemed to me that an article might be admitted in a newspaper that should not be tolerated for a book, and, on the other hand, articles may be put in book form that would not have point or value for the newspaper publisher. But there has been a question with me if our papers might not easily be made better for both, and then, being used more largely by the agricultural press, become more valuable. In this connection I have thought it might be worth while to get criticisms on our work as a society, from some of our agricultural editors, from their point of view. The burden of the criticism is something like this, which I quote in full from one of the replies sent in: "The papers, as a rule, are too long, and take too much time and space. That is, they are not to the point. What we want is matter direct to the point, and in as few words as possible to convey a full and complete meaning of the subject in hand."

Another editor says the papers presented at one horticultural meeting are not very different from those presented the year before, or those of one State are very similar to those of another State, and so the publication of papers in full would soon become a monotonous repetition. But this repetition cannot well be avoided. These meetings are in some sense a school, and many of the pupils are all the time beginners. The agricultural journals themselves are not free from repetition. They have practically the same set of correspondents year after year, so that with the average paper I find

that after I have read it one year I have a good general idea of what will be in it the next.

Another criticism that was offered was the lack of preparation that is shown in many of them, especially in the way of boiling down and arrangement. It ought to be enough of an honor to be asked to prepare a paper for one of our meetings, to induce a person to put his best efforts into it.

The society's reports have a circulation of about 5,000 copies, while the agricultural papers of the State would have a circulation running well above 100,000. Except for the permanence in form, a paper published in a newspaper would have as much greater value, and possibly more, as the circulation would be larger.

It was for several years the custom to have what were called *ad interim* reports from committees appointed for that work. It has seemed as if it might be worth while for me to make a few notes of that kind for this meeting. It was my privilege to make a visit to the Horticultural Experiment Stations of southern Illinois last September, and while there a few things that may be of interest were noted. In Marion county, north of Centralia, nutmeg melon growing has heen taken up very largely for the past few years. In the vicinity of Alma, Nutmeg growing seems to have taken the place, with many farmers, of the principal crop. Fields of ten to forty acres were not uncommon. The melons are planted in hills 4x4 feet, and cultivated like corn. They are picked and shipped every day—the principal package used being the twenty-pound grape basket. In these fields a good many melons will be found that are not marketable, and at the places visited these were fed to the hogs. On one farm from which 137 baskets had been taken to market the day of my visit, about half a wagon load were left for hog feed. Some seasons this business has been quite profitable and others it scarcely more than pays. A net profit of $50.00 an acre has not been very uncommon. The soil seems to be well adapted to this industry, and the greatest drawback seems to be the uncertainty of the markets. Some shipments striking an empty market bring good prices, and others on full markets almost nothing.

The Keiffer pear has also been planted very largely in this region. I found several very promising orchards of them about Tonti, Salem and Centralia. If the planting has been as general as these points would indicate, it will not be long until the Keiffer will be very common on our markets. These young Keiffer orchards where well cared for, are a fine sight. The trees are thrifty, upright growers and have a healthy, strong look.

Although I only had an hour's time to spend on it, I was very much interested in looking over the farm of Mr. Perrine of Centralia.

At the time I was there (September 25), he was still cultivating his strawberries. He said they had been cultivated once a week or oftener all the season. I did not see his newly set field, but one which he was saving for a second crop was more than equal to anything else I have seen this year. Mr. Perrine has some very promising young pear orchards, one of Duchess set three years and another older of Keiffer and Leconte. An orchard of Ben Davis nine years old surpasses in appearance any other apple orchard I have seen. The trees were regular in size, much larger than those of the same age grown here, with smooth bark, healthy and thrifty.

I have always been an admirer of our native persimmons. I have often walked five miles after night in December for a gallon of them, and much of the fruit picked up at such times was not specially good either. At Mr. Riehl's place I found the persimmon which he calls the Early Golden, and which is known to some of you, in excellent condition. The fruit is not large, but it is an exceptionally handsome fruit, does not become mushy, and the quality is excellent. In Marion county there are two trees bearing larger fruit than Mr. Riehl's, and almost equal to it in other ways. Other trees also were noted as bearing specially good fruit. Since then I have had some correspondence with men who claim to have or know of good varieties. One man at Danville, Ind., in particular, tells me that he has three varieties, one of which he calls Golden Gem, another Chambers and the other Daniel Boone. The Golden Gem, he says, ripens the first of September, and has sold in midwinter at $1.00 per gallon. Of the Chambers, he says, it is one and a half to two inches in diameter, ripe in November, of good quality. The tree began bearing at three years old, and has borne regularly ever since. A man from the central part of Douglas county has sent me scions from a tree which he says every one claims bears the best fruit they ever saw. I know of no fruit tree that bears as regularly as the persimmon, and while the demand either for home use or market will perhaps never be large, I believe there are plenty of varieties now growing that are worthy of general introduction. It can now be had in season from the last of August until the latter part of winter. I do not know of another fruit which in its natural state varies as much as this, and which gives greater promise for improvement.

PRESIDENT'S ANNUAL ADDRESS.

JAMES T. JOHNSON, WARSAW.

Ladies and Gentlemen of the Horticultural Society of Central Illinois:

It is one of the chief pleasures of my life to meet you and to be permitted to address you upon my favorite theme. Every horticulturist, whatever his special line of work, has reason to be pleased with the growth of public taste, and to feel that it is very largely due to the well-directed efforts of our society. "Horticulture is the fine art of agriculture," and serves to stimulate in its patrons a taste for the finer arts.

The people have to be educated; their tastes need lifting up until they can appreciate Delaware grapes and Downing strawberries. Some tastes are already above the uncivilized pork eater, and yet a gentle amelioration might be administered to them with the most happy effects, and every means of refinement which you are bringing to bear on the general public is tending to increase the demands for the horticulturists' best products, and you are not only increasing the demand as to the quantity used, but you also increase the demand for quality as well. At the same time you are annually enlisting a more profitable class of customers, those who will not be satisfied with "just any kind of fruit and vegetables." We are glad to note that there is substantial growth of taste in matters horticultural.

The day may come when the Ben Davis apple and the Keiffer pear cannot longer rule the markets alone, but our enterprise will need to be equal to the occasion; as we will be compelled to cater to the tastes we have educated, our people may indeed become so wise that we cannot hoodwink them by looks of fruit alone.

Our society has for its object, not only the production of the fruits and vegetables upon which we can subsist, but the improving of their quality, and adding to their value and utility by learning and teaching our people the better and more improved methods of their preservation and marketing. The business of the horticulturist requires something more than labor—it needs intelligent thought and ingenious effort. The man must ever be on the alert and ready to overcome whatever adverse conditions may confront him; but what occupation does not?

What land is anywhere better adapted to the highest perfection of rural life than central Illinois? You have the most wonderful soil and the most favored location for reaching and supplying the great markets of the world. This is, indeed, the favored land. Let us not tire of learning our business more perfectly. If we are to have greater yields and better quality of product, we should know more of what this favored soil contains, and how we are to most successfully assimi-

late it for plant food—for these plants and trees must first be fed in order that in turn they may help to feed us. Nothing is more wonderful, or a study of greater interest, than the chemistry of plant life —how the many different products are grown from substantially the same simple ingredients; but they do not all take the materials in the same manner, or of the same quantity, or work them into the same fashions. One plant takes a bit of carbon and stores it up as wood fiber; another stores it as a granule of starch, another as oil, and still another as sugar—and so on through all its various changes.

Do our people properly appreciate their opportunities? I have called attention to our fine soil and location, and dropped a few thoughts as to improving upon these; but being right where I find myself at the threshold of our own justly renowned University of Illinois, a seat of learning not only already one of the best, but destined to become the very best. Do we fully appreciate it? Fellow citizens, this institution was established and has been fostered to educate our children and enable our sons and daughters to enter the walks of life thoroughly equipped, especially to make farm home-life one of the most intellectual and refined, and hence the most to be desired. And so, viewing our opportunities in this light, situated in one of the best fruit growing and farming district to be found anywhere, should we not work with renewed energy?

These are the duties before us; these are the responsibilities to which we invite you, to press forward in this profitable, healthful and beautiful occupation, whose reward is ever present, whose devotees never experience real want. Here let your homes be permanently established, and (my word for it) the man who builds his home here, in the midst of Pomona's treasures—and whose gardens are ever kept fragrant with blooming flowers—will live in an atmosphere so pure and so refining that his position will be coveted, even by princes; and such lives cannot fail, but must grow brighter and better evermore.

SMALL FRUITS FOR THE FARM.

A. M. GOFF, RANTOUL.

Mr. President:

In choosing a spot for the small fruit garden, I would avoid a low moist depression, such as would be chosen for vegetables; I would rather select a slight elevation above the adjacent land, and if gently sloping all the better. If traces of clay are visible, I think it no detriment. Tile drainage will in most cases be advantageous.

It should, however, be in a good state of fertility, rich enough to produce, say fifty bushels of corn per acre. I would have the plat of some length, say twenty rods, and would leave vacant space enough

at each end to turn a team conveniently. The ground should be deeply plowed, in fall, if possible, and in spring well pulverized and smoothed.

STRAWBERRIES.

For strawberries, a good dressing of manure should be applied. Plant strawberries as early in spring as possible, in rows three feet eight inches apart and set the plants sixteen inches apart in the rows. Young thrifty plants are best. Have the rows straight, by using either marker or line. Set the plants with roots spread somewhat, and deep enough so that the crowns will just come even with the top of the ground after they have been firmly pressed down. After pressing, brush a little loose soil around the plants, to fill up any depression and leave the ground level.

As soon after setting as the ground becomes hardened by rain, or weeds appear, cultivate, running shallow next to the plants and leaving no plants covered with soil. Dress out the rows with the hoe. Repeat this operation every two weeks or oftener. As the runners take root and the rows become thicker and wider, narrow the cultivator until the now matted row becomes about eighteen inches wide. Mulch in December with straw. Put on only enough to really cover the ground all over.

The second season a crop may be expected. Do not use a hoe or plow until after picking is over, but pull up any large weeds, tufts of grass or clover that may appear.

After the picking season is over, as soon as possible run the one-horse plow along the rows, narrowing them up to about eight or ten inches wide, turning away from the rows, then go through and with hand and hoe clean out the rows of weeds and grass. After a few days cultivate down the ridge made with the plow and tear up and pulverize the whole space between the rows. The patch may now be treated the same as it was the latter part of the first season.

Generally a good crop may be had the third season, and if the plants remain healthy and the stand good it might pay to clean out again after picking. But if the ground becomes too foul, or the stand poor, better plow up and plant to fodder corn. Meanwhile, it is presumed a new patch has been got under way to take the place of the old one.

There are many good varieties, among which may be named, Warfield, Parker Earle Haverland, Bederwood, Captain Jack, Sharpless, Crescent, Gandy and Glendale.

It is better to have several varieties, and plant in alternate rows, one row of a kind intermixed throughout the patch, thus insuring the most perfect fertiliization.

RASPBERRIES AND BLACKBERRIES.

Raspberries, I plant in rows six feet apart, blackberries eight feet; both three feet apart in the rows. Take good one year plants about the middle of spring, make deep furrows with a two horse plow. Set the plants by covering lightly and tramping over the roots, then fill the furrows level with the one horse plow.

Give careful and clean cultivation. A row of sweet or popcorn or potatoes may be raised the first year or two between the rows. The second year and thereafter, the young canes are topped at a height of eighteen to twenty-four inches for raspberries, and three to four feet for blackberries. At the first plowing in spring turn away from the rows working as close to the plants as possible without disturbing them. Dress down the ridges left with the hoe. A few days after, plow again, turning toward the rows. For the balance of the season the one-horse cultivator should be used. Shallow cultivation may be given with benefit all the season. The great drawback with blackberries is drouth which often prevents the growth and ripening of the fruit. For the farmer who has plenty of straw, I know of no better safeguard against drouth than a good mulch applied in spring, or better still in June after the surface has been kept pulverized for awhile with plow and cultivator.

Before field work commences in spring break down the dead canes with a hoe and remove them out of the patch with a fork and burn them; also at this time shorten back the raspberry bushes, by cutting off the ends of such branches as droop over into the space enough to obstruct cultivation.

Among varieties I have found reliable, I name the Gregg at the head of the best of raspberries, followed by the Souhegan, and Shaffer's Colossal; the latter is classed among reds. Among blackberries I have most faith in the Snyder.

GRAPES.

Grapes will thrive in almost any situation and under almost any, or no treatment. Climbing upon the porch, hanging upon the garden fence, or rambling over a pear tree; it will yield its fruit almost as regularly as the seasons come and go; yet, no fruit will better repay careful culture. A few rows across the garden, trained upon trellis, regularly pruned and carefully cultivated, will prove a good investment. Place the rows eight feet apart and the vines ten feet apart in the rows. Plant either one or two-year-old vines well rooted. Run the plow several times back and forth to make deep furrows. Enlarge these where the vines are to be set to a hole about two feet in diameter and one foot deep. Stick a stake where

you wish the stem of the vine to be. Then fill in around the stake with mellow soil till you have a conical mound six inches high. Place the stem of the vine against the stake and spread the roots in all directions so that the ends will reach the bottom of the hole. Fill in till the roots are covered, then tramp firmly, after which complete the filling. Potatoes, sweet or popcorn may be grown the first two years between the vines and rows. The second year allow no more than two canes to grow and keep them tied to the stake. The third year either build a trellis of two vines placed two and one-half and five feet from the ground, fastened to hedge stakes or posts, or add stakes enough to support the vines.

While a somewhat elaborate system of pruning and summer pinching is necessary to obtain the most perfect bunches of the highest excellence, very fair crops may be had by simply shortening in the last season's growth enough to prevent the setting of more fruit than the vine can carry through to full growth and maturity. In determining how much to cut out, the size and vigor of the vine must be taken into consideration. If the vine has made a vigorous growth the past year, it is capable of bearing a full crop of grapes, and may be pruned accordingly. If the growth has been feeble, less new wood should be left. Bear in mind that the fruit is borne upon wood of the *last* season's growth. There is less danger of leaving too little than too much. Too many bunches and too much foliage often cause blast, mildew and rot, and result in no crop at all, when fewer bunches with plenty of air and sunlight would have matured satisfactorily.

The Concord stands at the head of the list of hardy, iron-clad varieties. Worden, Moore's Early and Pocklington are also hardy. The two former are a week or two earlier than Concord, the last a week or two later than Concord. Niagara, Moore's Diamond, Empire State, Brighton, Lindley and others are superior in quality, but require protection in winter. Those who are willing to take the trouble to do this will be well repaid. To do this, prune the vines in November. Dig with the spade in the line of the row under the trellis a shallow trench about three inches deep, and wide enough to hold the vine when gathered into somewhat compact form. Lay the vine in the trench and hold down with one foot, while you fill the trench and put on sufficient earth to hold down and cover the vine. It is well then to plow the ground, turning toward the rows. In spring lift the vines with a fork, not too early, but before the buds have swollen. Tie the vines evenly distributed on the trellis. In the first plowing turn the soil backward away from the rows and dress down the ridge under the trellis with the hoe.

CURRANTS AND GOOSEBERRIES.

Currants and gooseberries are of the easiest culture.

I prefer good two-year-old plants. Line out with the plow as for raspberries, and plant out in rows five feet apart and three feet apart in the rows. Give clean culture two or three years, after which a mulch of coarse, strawy manure, applied often and heavy enough to keep down weeds and grass, will answer in place of hoe and plow and give good results.

The old Red Dutch is as valuable as any. The Cherry, larger, but less productive, is good. The white varieties are not quite so acid, but less esteemed on account of lack of color. The old Houghton's Seedling is the most useful gooseberry. The Downing is larger and gives variety.

DISCUSSION.

Mr. Augustine—A matted row of strawberries eighteen inches wide is too much. The plants are crowded and weak, and cannot produce as good fruit as if there were fewer of them. I like hills for most varieties. With matted rows we get too many berries, and they are not large enough. Fewer but larger berries would be worth more on the market, and be more satisfactory to both the grower and user. Large fruit is specially gratifying to one who grows it for home use. As soon as done picking strawberries I would burn everything off clean and in this way get rid of all insects that are on the plants.

In regard to pinching blackberries; I would not allow them to grow more than eighteen inches high before nipping back. This gives a better bush than if they are allowed to grow taller. I would not mulch blackberries or raspberries. There is no mulch that is equal to good culture for keeping the ground in good condition and keeping things growing.

Mr. Goff—My idea in using mulch for the fruit on the farm is to save labor when labor is valuable and scarce. Straw is always plenty, and it may be put on the ground during winter or early spring, before regular farm work begins. It then saves the cultivation, which the farmer would not do anyway.

Mr. Hartwell—If you can put your plants in rows where they will be on the road to the cornfield and then run over a row every

time you go out or come in, it will be found no hardship to cultivate. I cultivate my strawberries as often as fifteen times during the season. Burning over of the strawberry field when the ground is very dry is not safe. I have known men to destroy their whole fields at such a time.

MR. AUGUSTINE—In putting down grapevines, it is not always safe to cover them all up with soil. In an open winter there is danger of the buds decaying. Usually, just laying on the ground with a stick or brickbat to hold them there, or throwing on a shovelful of soil to hold the plant down, is all that is needed.

MR. GOFF—I am very much in favor of laying down the tender grapes and covering them with soil. I have so far seen only good results from it. The hardy varieties like Concord may be treated as Mr. Augustine suggests.

MR. JONES—The Early Harvest blackberry is coming into prominence with us, and I believe it will be valuable. It is not entirely hardy, but, by protecting just as was recommended for grapes, it does well.

THE FARMER'S ORCHARD.

H. M. Dunlap gave a talk on this subject which, in many respects, was very similar to what may be found in an essay entitled "The best method of planting and growing an apple orchard in Illinois," which may be found in this volume, page 18. For a list of 100 trees for a farmer's orchard Mr. Dunlap recommended essentially the same varieties as those selected by the State Society for the central district, a list of which appears on page xii of this volume.

DISCUSSION.

MR. AUGUSTINE—While planting the trees in the orchard I would dip the roots in water to keep them in good condition, and then the dirt will adhere more closely to a root that is wet than to one that is partly dry, and this puts the tree in better condition to grow. The keeping quality of apples is controlled very largely by the locality where they are grown. Some soils cause them to ripen earlier than others.

Mr. Winn—Apples from an orchard in grass will keep longer than those from one that is kept well cultivated. Commission men understand this, and will pay most for the fruit from the orchard in grass if they are buying apples for keeping.

Mr. Hall—What about pruning?

Mr. Augustine—I do not believe in pruning unless the tree is diseased, and then it would be about as well to trim close to the ground. I would, however, cut out watersprouts; but every time you take off a large limb you leave a sore which may, in time, result in the destruction of the tree.

CAULIFLOWER; HOW I GROW IT SUCCESSFULLY.

H. DE YOUNG, URBANA.

Mr. President:

Almost any soil is suitable for cauliflower where cabbage will grow. Enrich it well with manure at the rate of ten to twenty tons to the acre. The manure should be well rotted and be thoroughly plowed under, and the ground otherwise well prepared.

The variety I prefer is Early Snowball and the Early Dwarf Erfurt, as being the best kinds for early market in this latitude.

I sow the seed about the middle of February in a hot-bed. The material I use for hot-bed is fresh horse manure. I first throw it in a pile to ferment, and after the first heat is out I place it in a pit about two feet deep evenly spread, and then I place a frame on that for the sash. I then put on water at the rate of about a half gallon to the square foot. I next put on soil to the depth of eight inches, having the soil well mixed with one-third well rotted manure. Then put on the sash and keep it closed until the heat rises.

After two or three days I sow the seed and cover it about one-eighth inch deep and press it down lightly with a board. After the seed begins to grow the plants must have some air, when it is not too cold, to keep them from rotting off.

As soon as the young plants are large enough to handle, they are taken up and transplanted to one inch apart each way. They must be kept well watered. Before time to plant out doors, they must be hardened by being exposed as much as possible to the open air. When you are ready to plant out give the plants a thorough soaking in the hot-bed before taking them up; this should be done several hours before hand.

I mark the ground off two and a half by three feet and plant with light spade. Set deeper than the plants grow in the hot-bed

and press the earth down firmly about them with the feet; by doing this way I seldom lose a plant. The cauliflower likes a cool moist soil and a cool atmosphere, and so it is not worth while to try to have it unless it be planted very early, so as to come on before the heat and drouth of summer, or else plant late and have it come in during the cool weather of the fall.

I cultivate with a one-horse cultivator twice a week each way when the plants are small, and when they come to maturity and the flower appears, I cover them with a leaf of the same plant, laid on the flower every morning early or after sunset; in this manner of protecting I have always found success.

DISCUSSION.

MR. AUGUSTINE—We would like to know about some other things. How do people here who are successful with celery manage it?

MR. HUBBARD—Celery plants need a rich soil and plenty of water. In bleaching for home use I take it up with some dirt and set it as close as it can be crowded in the cellar; by giving it enough water at the root to make it grow some, and keeping the tops dry, it bleaches very well and is tender and good.

MR. RAYMOND—I find that I can bleach celery very well by simply putting a four or five-inch tile down over the plant.

SPECIAL TRAINING FOR FARMERS IN PUBLIC SCHOOLS.

J. L. HARTWELL, DIXON.

Mr. President:

The scientists can discover no difference between a monad and a man in the first stages of development. A monkey baby in thirty days from birth has more wits than a human infant of the same age. A fully developed, skillfully trained horse has more intelligence than an adult human who has had no training from infancy to manhood. A man educated to vicious habits makes a bad citizen. A horse with a liberal education is of value to any community. The child of an Emerson educated in the family of a cave-dweller would be a savage of possibly a somewhat improved type. The papoose of a savage educated under the refining influences of a Longfellow's home may never become a Longfellow, but his conception of life would doubtless be on a higher plane than those of his parents. An infant of Christian parents reared in a Buddhist family would be a Buddhist, and vice versa. A man is

the aggregate of the influences, education if you please, bearing on his life, plus the effect of inherited tendencies.

That we may unlock this great treasure house of knowledge found in books and pour its flood of intelligence into man's consciousness, he must learn to read. That he may make a record of his own thoughts for the benefit of others as well as himself he must be able to write. That he may know something of relative distances, times, areas, values, etc., and be able to transact the routine of man's business relations with man, he must know something of numbers, and computations connected therewith. The language which he uses as he writes and talks must have some uniformity and be subject to certain laws and so he is trained in grammar. And so we have builded a system of school lore the acquisition of which is supposed to give the children of our schools the best possible preparation for citizenship, but much of it is arbitrary, dogmatic, artificial and defective—a natural result of man's finite conception of things—and it is not surprising at all that we are brought up every now and then with a jerk, forced to take new bearings, readjust ourselves to the infinite and start off with different theories of the true meaning of life.

It is interesting to trace the changes through which humanity has passed as to what constitutes the true theory of education. Prehistoric man and the remnants of savage life which have lingered along down the ages looked upon life as a conflict between different tribes or gens, each striving for the ascendency. Their children therefore were and are taught the arts of war. The Greeks found the highest type of beauty in the human form and physical culture took precedence to all things else with them. As a race the Anglo Saxons have at different times adopted in whole or in part, many strange vagaries, not the least of which is the belief that our bodies are fountains from which most if not all our evils flow and as a necessary corollary they should be abased, starved, crucified. There is a grain of truth in all these theories as there is in most if not all theories and at the same time a great deal of error.

When Horace Mann and his co-workers brought into existence our elaborate system of graded schools, it was thought that the millennium in education was near at hand. Fine public school buildings, crowned with that diadem, the High School, of which America is so puffed up with pride, shot heavenward all over the United States. Everything was to be graded—pnpils, text-books, seats, teachers. Organization, classification, system, method, were the watch-words. We have all this and still we are not happy. Some of us are suspicious that there is still room for improvement; that the ideal has not been reached.

The school life and the farm life are two distinct worlds having little or no relation the one to the other. The only place they seem to touch is in the arithmetic and so the boys figure winter after winter laboring under the blissful delusion that they are learning to compute

interest on the money for the acquisition of which they are developing little or no ability. They read in history of farmers' boys who have become statesmen, merchant princes, noted physicians, lawyers, ministers and men of science. They look back at their home life and see little but hard work, sore muscles, dirty and ill-fitting clothes, chapped hands, small compensation, plain and unattractive homes. The city people drive by with well-groomed horses, handsome carriages, rich and attractive raiment. At the grocery store they see their city cousins ordering the finest fruits, brought from all parts of the world, and other palatable foods, knowing that the sole supply from which their mothers must draw for their tables is a barrel of salt pork, sack each of flour and corn meal, brown sugar, poor grade of coffee, a bin of potatoes, possibly some California dried apples and an occasional fried chicken.

When I quit teaching five years ago, every school journal and the public press in general were discussing the question "Why boys leave the farm?" The more natural question as it seems to me, would be "Why do they stay on the farm?" There is doubtless something wrong here. Let us seek for the cause and in doing so possibly we may find the remedy. Let us begin our investigations with a baby old enough to sit upon a rug. Place on one side of him a piece of cardboard on which is printed the alphabet—on the other a bouquet of flowers. In ninety-nine cases out of a hundred his first lesson will be in botany. The six-year-old baby will show the same perverted taste. Try him at eight with the multiplication table and a microscope and a bug. He will vote the multiplication table dry stuff and his first lesson in entymology will produce a pair of sparkling eyes. If at fifteen he has a choice between square and cube root and the roots of plants, those found in books will be given the cold shoulder. If he may choose between a lesson in grammar and one in grafting he will say "Throw grammar to the dogs; I will none of it." In addition to his knowledge of flowers, of roots, of bugs, etc., he will acquire, unconsciously, in connection with lessons on these subjects, ability to use words much superior to that which a study of grammar will give, and his knowledge of numbers acquired in the same unconscious way will be more practical than that picked from the dry bones of a multiplication table. I have a boy nine years old and it is my purpose that he shall feel when he is twenty-one that of all places on earth his farm home is the most desirable place to be.

A row of well cared for thrifty trees is very much more beautiful and attractive than a row of houses. Thus far the country boy has or ought to have the advantage over his city cousin and this the city cousin will concede at once. I will teach my boy how to plant trees, let him study their roots and teach him their functions; will show him the difference between a properly and improperly planted tree; about pruning the roots, placing them in the hole, firming the dirt about

them, pruning the top that it may be well balanced; looking after insect and fungous foes, protecting it from sun scalds, summer drouths and winter frosts. I will show him how the tree gets its food from earth and from air. In addition to what the teacher may do, I will give him a proprietorship in a few trees; an apple, a cherry, a plum and an evergreen; expect him to care for them under my supervision and have for his own whatever they may produce. He and I will study together the large and important subject of plant reproduction, through seeds, buds and roots, and in this we shall not overlook the parasitic plants that get on leaves and the fruit, and make scabby apples. After we have picked to pieces and examined the various parts of many flowers and learned their uses, I shall expect him to think that a natural flower is much prettier than the artificial one on his city cousin's hat. He will know why I plant the Captain Jack strawberry near the Warfield, why I keep bees although I get little or no honey. He will know why it is never safe to buy nursery stock of anyone whose honesty has not been thoroughly tested. My boy will know before I am through with him that the ultimate germ of a human organism and that of a plant are exactly alike as far as we can discover, and that kinship is not so very remote. I shall expect him to have a kind of brotherly affection for all of the great world of organic life, and feel a deeper reverence for the Maker of all, because of his knowing the relationship.

This is what the parent may do for his boy. It has a reality and enchantment that the same matter presented from books can never give. The duties of a teacher and those of a parent are identical as far as instruction is concerned, and the more completely the teacher is able to assume parental supervision and influence, the more profit to his pupils will come from his work.

The farmer boy who can have an intelligent pedagogue or foot companion (for that is the primary meaning of the word), to accompany him about his father's farm, interpreting this phenomenon, leading him to observe that, in other words bringing him into contact with and making him a student of the living, growing, sentient world around him, is the most fortunate of God's creatures. He will learn to love the grasses, the mosses, the insects, the flowers, the trees, the shrubbery, the fruits as he sees them in their native habitat, and feel lonesome and homesick when separated from them.

I would have every country school a college to educate farmers and farmers' wives for the farm. All the work of the school should point that way. The doctor, the lawyer, the minister, the teacher, the book-keeper, the electrician, the chemist, the artist, the musician, the architect, the engineer, the pharmacist, the machinist—each has his special course of instruction, and, as a rule, those who reach the highest standard in these callings, are those who are subjected to special discipline. The farmer or the fruit grower who is indifferent to the revelations of chemistry, must drop to the foot of his class; if he turns

a deaf ear to what the entomologist has to say, he will raise a larger crop of chinch-bugs than of wheat, of codling moths than of apples; if he votes the lore of the botanist more ornamental than useful, he will be enrolled among that great army with experiences like my neighbor who had an elegant bed of pistillate strawberries which bloomed profusely yet bore no fruit. While I would limit the course of study in any school to that which is practical, the meaning of the word practical as it is usually defined is very much too narrow to fit the application which I would make of it. Anything is practical in education which assists in putting one in right relations to his surroundings, and this definition would not necessarily exclude such subjects as music, drawing, grammar, the classics—much depending upon the tastes and natural aptitude of the pupil.

This much is certainly true: the more nearly one is a perfect master of the details of his calling, the more he will enjoy it and the greater will be his success in the prosecution thereof. It seems, therefore, perfectly clear to me that it is eminently practical for a farmer's child to have special instruction in school in matters pertaining to plant and animal life, composition and manipulation of the soil, etc.; and to make it thoroughly practical, I would have in connection with every country school an experiment station.

I am not unaware of the importance of skill in the direction of such work, neither am I unmindful of the fact that an attempt to put into execution such an idea without its being preceded by much careful and thorough preliminary work, would result in a monumental farce.

There is little in education of which the same thing could not be said by going sufficiently far back in the evolution of mankind. All revolutions whether political, moral, religious, social, or educational are first preceded by a change in the sentiment of the people, especially under democratic institutions. A wise monarch whose will is law may by his simple mandate overturn, reconstruct, and put in execution a wise, though radically new, policy. Its stability is necessarily as transient as human life. The next monarch may overturn it all.

A policy that is wise, abstractly considered, is not always judicious. The word education in the minds of most people is synonymous with book lore. An effort to break loose from this idea was made some years ago in the introduction of the study of the so-called natural sciences in our public schools. Very little has been accomplished of what was intended by the originators of this movement. Our children have learned to pronounce a number of technical words without learning much science. Some city schools, notably Chicago, and for aught I know some country schools as well, are drawing the line closer, are conducting what are called "nature studies," ignoring almost entirely books and technical expressions.

It is my impression that there are communities in this State who

are ready to endorse the idea of converting their public schools, in a limited way, into industrial schools for farmers. There are individuals in most communities who would do so. If I have succeeded in getting one farmer to give this thought serious consideration, my paper has not been written in vain.

The surface facts of the life of a husbandman have been the inheritance of the race since the age of pre-historic man. That ground needs stirring is known to all; why it should be stirred, comparatively few can tell; why and how it should be stirred to produce the very best results, is known to a still more limited number.

Prehistoric methods cannot compete with nineteenth century methods. Progress through heredity is necessarily slow. Man has made tremendous forward movements since he has learned to record the results of his growth. When these results were brought together, arranged and classified, farming became a science and subject to the same law of growth as other sciences. The science of husbandry is probably the least generally applied of all sciences. Because husbandry was the first occupation of primitive man, the necessary corollary in the minds of many people is, that it is the simplest of all sciences—"Any fool can farm."

Chemistry as a science is very old, yet most of the advancement in the knowledge of chemistry has been made in the last twenty-five years. If husbandry is ever to rise to the dignity of a science, it must be made the subject of special study by those who follow it; and the only way this can be brought about, except in a very limited sense as it seems to me, is to make it a prominent part of our public school work.

DISCUSSION.

PROF. BURRILL—I think the day is coming when we will have to admit that the practical education is the thing, but it would be a mistake to make our education too narrow. We cannot dispense with what we now have, but we may add to it. If education means anything it means preparation for life. The scheme outlined is an ideal one and if there were no obstacles in the way it would have been done long ago. The question is, how to manage the large number of pupils with the present equipment. If, as in the case of the writer of the paper, each one could teach his own child, the ideal would be reached, but that time is a long ways ahead. As it is, the capacity of both teacher and pupil is limited, and the teacher must measure off the stent for his pupil and see that he does it. The schools as we have them are admirable institutions, but there is always room above

for their growth, and they are growing. We think we are paying lots of money for teachers now; but the fact is, the time is coming when we will pay twice as much for teaching right along the line of this paper.

THE FARMER'S HOME.

N. CLIFFORD RICKER, PROFESSOR OF ARCHITECTURE, UNIVERSITY OF ILLINOIS.

Mr. President:

Perhaps the most serious and most common source of discontent with the farmer's vocation is the lack of intellectual life in too many farm homes, at length becoming intolerable to the young people, who ought to remain on the farms and worthily continue the work of their fathers and mothers. To them life seems to be made up of unvarying drudgery, even if a living be assured; and at the first opportunity, they hasten to the villages in order to labor more hours for smaller remuneration, simply because life seems brighter and more eventful there.

Another cause is the comparisons inevitably instituted by the farmers' boys and girls, in visiting their village friends, and enjoying the unaccustomed comforts of their well appointed homes, far superior to their own, though frequently owned by persons of more limited means. The hard-working and tired farmer's wife, whose sole kitchen equipment is frequently a pump in an outside well, a stove, table, and a few shelves, envies her village sister who has the latest range, hot and cold water supply, a convenient sink, a lovely pantry with all imaginable shelves, bins, drawers; set tubs in a laundry, an attic for drying clothes; rugs and carpets, and above all, plenty of books and papers. Why should she not have the advantage of such helps, especially when she is the hardest worker on the farm, and her husband does not hesitate to purchase all necessary machinery, to reduce his labor and cheapen the cost of production? Consequently, it is no wonder that nice and thoroughly good and desirable young farmers, who would make the best of husbands, find it increasingly more difficult to persuade the best women to join them in the present discomforts of farm life. Convenient houses with the necessary equipment for housekeeping, at least equal to those of persons of smaller means living in villages, would go far towards solving this increasing difficulty.

Necessarily confining myself to but a small portion of this very interesting topic of the discontents of farm life, I shall this evening endeavor to point out some ways in which this life might be made

brighter and more comfortable, and especially by improving the home and its surroundings. Farm life ought to most nearly approximate the ideal life in this country, and if the houses were as convenient and cheerful as those of village residents possessing even much smaller net incomes, one principal cause of the overcrowded condition of cities and towns would be removed.

First, in regard to location and site of the house. A southeast exposure is the one most pleasant in this climate, for all seasons of the year. It is usually necessary to build on or near the main road, to economize land, and to palliate the loneliness of farm life, as far as possible. But even with a northern exposure, it is not necessary to have a house with northern entrance, into which the cold wind swoops, every time it is opened in cold weather. A side entrance avoids this evil and is just as convenient, so that the desired outlook may be obtained on almost any site. Dust usually drifts to the north in summer, but nevertheless, a site on the north side of the road is generally the most comfortable, especially in winter, and even in summer, the night breeze also usually comes from the south, making the sleeping rooms cooler on the south side.

The site should be a raised knoll, if possible, to secure proper drainage, dry cellar, and due oversight of the farm and its surroundings. A sandy or gravelly knoll would be ideal, for it would promise the best drainage. It is generally best to put in a cement-jointed tight sewer to carry all house wastes to a sufficient distance and a safe outlet, where no pollution of the drinking water of cattle would occur. The best disposal of sewage is to let it run through a coarse wire netting into a loosely jointed drain of farm tiles, placed at a safe distance from the house and a foot deep under a garden or lawn, where the wastes will be quickly oxidized and taken up by plants. Most persons are very careless in this important matter of drainage, from ignorance; not realizing that typhoid fever is propagated by disease germs from a patient, taken into the stomach in impure water, milk or food, and that a second case of fever in a house demands careful investigation of the water and milk supply of the inmates. It should be subject to heavy fine, just as a German householder is heavily fined if a fire occurs in his dwelling. All discharges from a fever patient, spittle from diphtheria or consumptive cases, should at once be sterilized by a strong disinfectant, so that the other persons may run no risks of unnecessary illness. Thirty persons out of ninety were recently infected with typhoid fever by raw oysters, temporarily placed in water near the outlet of the drain from a house in which a case of fever had occurred. Milk absorbs disease germs with avidity, so that it is dangerous if not boiled, besides frequently transmitting consumption from tuberculous cows to human beings.

The water supply of a house should never be a spring, no matter how clear and sparkling the water may be, for surface drainage of all kinds find its outlet there, especially from manured fields, and hog and stock yards. Fever poison has been sometimes transmitted half a mile so as to kill the persons using the water, and it is likely that the specific poison of ague is far more common in the water of springs than in that of wells. The safest supply is a driven well carried to a sand stratum underlaying a thick bed of clay, and a plain iron pipe is preferable to a galvanized one, because its rust is soluble in the water and is deadly to disease germs, while being harmless or even beneficial to man. Most of the dangerous impurities in water remain near the top of the water level in the soil, sinking with it, thus explaining the coincidence of abundant typhoid fevers and low water in the wells. Ordinary open wells are dangerous, receiving surface drainage, dead fowls, rats, etc., so that unless frequently cleaned out, they are as bad as springs. It is safe to say that a well usually in this soil drains a circle whose radius equals its depth, so that all privies, hog pens, stables, chicken coops, and house wastes, should be rigorously kept outside that limit. If an open well must be used, make it of lengths of large tiles set on end and cement-jointed for at least ten feet from the top of the ground; pack the earth firmly around the tiles, and fit on a tight cover to receive the pump.

Cisterns are dangerous for drinking water, although less liable to pollution than open wells. But it is practically impossible to keep out all vegetable matter, soot and dust, so that very favorable conditions exist for the propagation of disease germs, should any accidentally get into the cistern, which is very likely to happen, when the overflow empties into a drain, as in common practice. The water is also unpleasant in taste, except when wood alone is burned as fuel. But a cistern is necessary for the supply of soft water for washing and cooking. A good cistern costs about fifty cents per barrel capacity, and one holding from seventy-five to one-hundred and fifty barrels is usually necessary for medium house with range, hot and cold water at sink and in laundry, in order to provide a sufficient supply to last through dry weather in summer.

A pump at the sink is far more convenient for the busy housewife, than at the well outside, and is not expensive. A force pump in the kitchen, with a few minutes' labor daily, will fill a large tank in the attic, which will supply the range boiler, hot and cold water at the sink and in the laundry, as well as in a bath room on the second floor. All these conveniences are well within the means of anyone that can afford to build a fairly good house, and cost far less than a tower or some other external excrescence, of no use except to swell the builder's bill.

Lighting will necessarily be by kerosene lamps, which are dangerous, dirty and unhealthful. For large country houses, gasoline gas plants are frequently put in, which supply gas that costs about the same as oil for the same amount of light, usually about $1.00 per thousand feet, but the plant is not durable, seldom works with entire satisfaction, and gets out of order. A farmer with a good gas well has a bonanza, for even if it only yields a blue heating flame, the gas can be easily and cheaply enriched so as to make it excellent for lighting purposes.

Heating the house may be accomplished in many ways; by fireplaces, stoves, furnaces, by steam, or hot water apparatus, or by a combination of these.

Fireplaces are very pleasant and cheerful, and should be put in for their excellent ventilation, even if seldom used for heating; but they waste fuel, ordinary ones only utilizing from six to ten per cent of the total heat in the fuel burned. One experience in trying to warm a room in very cold weather by burning green wood in a large fireplace will convince one of this fact. Improved ventilating fireplaces heat fresh air in a chamber behind the fire and pass it into the room, which they warm more uniformly, and utilize from twenty to thirty per cent of the heat in the fuel, or three times as much as the common fireplace. A grate with tiles and mantel, ready to set, now costs from $12 up, and are very durable.

Stoves utilize from seventy to ninety per cent of the heat of the fuel, are the most economical means of warming, but are not durable, are dirty, require much labor, and, above all disadvantages, make no provision for ventilation. Hard coal stoves are more convenient, but usually leak gas, easily perceived in entering the room, and produce headache and sickness.

Furnaces, if sufficiently large and properly set with large ducts and hot air pipes, are preferable to all other modes of heating farmhouses of medium size and cost. The usual danger is that a cheap job is contracted for, the furnace is too small and must be forced in cold weather, soon burning it out, and requiring frequent repairs. With a proper furnace, soft coal can be used as well as hard, at a much smaller expense, and with no difficulty in keeping up a fire all night. When the house is sufficiently warm abundant ventilation is assured, especially if some grates are put in to serve as foul air flues, which they will do properly, even if fires are rarely built in them. A good furnace, with the necessary pipes and registers complete, will cost from $150 to $250, according to size of house, length of pipes, and quality of the job. Most complaints of furnaces are the result of incorrect setting, or their being too small. No leakage of gases through cast iron plates or joints can occur into the hot air

chamber, when a sufficient draft flue is provided for the smoke. My former prejudices against hot-air furnaces have been entirely removed by several years' experience with a good one, and I now consider it the most economical, healthful and satisfactory method for warming houses. It utilizes from seventy to eighty per cent of the heat in the fuel, costs less than an outfit of stoves for the house, and less than one-half as much as the cheapest steam or hot-water apparatus. No provision for moistening the air is necessary, for an increase in the amount of vapor in the air in the house would only make the atmosphere warm and steamy, opening the pores of the skin, and causing frequent colds from going out into the open air.

Steam heating by direct radiation requires a costly apparatus, with frequent repairs by skilled mechanics; soon wears out, provides no ventilation, and the radiators are habitually set in front of the windows, where they are unsightly and in the way, especially in summer, since they cannot be moved out when not in use, like stoves. Besides, there is danger of leakage of water to spoil carpets, plastering and the housewife's temper. If the safety valve is omitted or rusts fast, there is always danger of an explosion, and especially if the water should become low in the boiler and an attempt be made to fill it suddenly. The pipes are noisy, unless put in by an expert. When indirect coils are used in connection with ventilating ducts and registers, the cost of the apparatus is materially increased. As to the common statement, that heat from steam apparatus is moister than from other sources, there is no foundation for this in fact, unless there be a considerable escape of steam into the room, and it is only a trade fiction of the steam heating contractor.

Direct hot water heating likewise produces no ventilation; its first cost is from twenty-five to fifty per cent more than that of steam apparatus, and it only possesses the advantages that it requires less frequent attention in firing in moderate weather, and that the apparatus is much more durable than for steam, though far more difficult to put in to work properly, since the motive force of the circulation is much more feeble, and is easily neutralized by friction or obstructions in the pipes.

Hot water or steam apparatus could only be used in the larger houses, and would even then be found inferior to the best furnaces. Good ventilation is just as important and essential to health as a pleasant temperature.

The cellar of a house is intimately connected with the state of health of its inmates. It pays well to excavate a cellar under the entire house, then laying the walls in cement, and concreting the entire area enclosed inside them. Since the water level is usually not far from the surface of the ground on the prairie, evaporation

constantly occurs, especially in dry summer weather, no matter how dry it may appear, and this dampness within the house causes more frequent and violent attacks of some diseases. Men are out in the open air so much that this dampness effects them less than women and children. It is unnecessary to say that decaying lumber and vegetables should never be permitted in any portion of the cellar.

Materials for building purposes vary with the resources of the locality, but throughout the State in general, it is safe to say that brick or stone will be found to cost from twenty-five to fifty per cent more than wood, and unless properly and carefully built, masonry dwellings will be colder and more damp than those of wood. Bricks absorb a large quantity of rain water, which saturates the wall and evaporates into the house as well as externally.

A wooden house should be sheathed externally with boards of uniform thickness, but which do not require matching. Over these should be placed at least two thicknesses of the best and thickest building paper that can be obtained. Building felt would be still better. Joints of the paper must be carefully broken, and this covering will effectually keep out winds and heat, and make a very comfortable house in all seasons. The transparent yellow paper so much used for sheathing by builders is useless, as the oil is soon absorbed by the lumber, and the paper becomes brittle and cracks.

Double floors are to be preferred, the lower floor being of common boards, the upper floor of matched lumber being put down after the plastering is all dry, so that it will be free from stains, and can then be finished as desired. A double thickness of paper laid in the floor above the cellar will make the lower rooms much warmer and dryer.

Although these suggestions will slightly increase the cost of a house, yet it is safe to say that they will pay a very high interest in time, besides saving such sickness and discomfort. They would undoubtedly lead to great disturbances in the medical profession by reducing the number of cases of sickness one-half, unless the profession should become, as it ought to be, a health insurance association.

Paints are, of many kinds and values, like horses; and it has unfortunately become very common to adulterate the cheaper mixed paints with lime, forming a lime soap instead of a lead soap, then taking up a considerable quantity of water, in place of the oil, which ought to be used for mixing it. It will stay on for awhile, until the painter has been paid off, but soon becomes chalky and fades. Even the ground white lead is mixed with barytes and linseed oil with fish oil, which is useless, except to sell. The only safe course is to purchase from a dealer of known integrity, and then employ an honest painter to put it on. It is probable that more

deception and cheating is found in paints and painting than in any other branch of building, except in varnishes and varnishing. Frauds are only detected by experts with difficulty, sometimes only by trial.

Now that good hard or yellow pine is even cheaper than the best white pine for floors, it should be more frequently used, as it has a good grain and wears well, though not equal to oak or maple. No matter what the books say, waxed floors are only properly finished by experts, require constant care and labor, and collect dirt. It is much better to finish the floor as smooth as possible, then give it a coating of shellac in alcohol, afterward applying several good coats of the best special floor varnish. A good article will cost about $4.00 per gallon and will be satisfactory, while a molasses varnish, like that commonly used for varnishing church pews, will be dear at any any price, and will probably stick the children fast, like fly-paper. Then a lot of nice rugs will cost much less than carpets, will look far better, and can be dusted and changed around as frequently as the housewife desires. This gives the room a clean and cheerful appearance, and will be effective, while the selection of a carpet is often only the choice of the one that is least dreadful in pattern and color.

The walls and ceilings will have to be plastered, and are usually left white for a few years, then papered, which probably also makes the rooms warmer. But wall papers are now of too large patterns, and are seldom artistic in effect, especially in small rooms, or when walls are cut up by doors or windows.

Hard plaster is much stronger than the ordinary kind, but costs nearly one-half more, and workmen have not yet learned to get as smooth and nice a finish on it, because it dries and sets so much quicker. It is usually tinted with a wash of color, which is said to make it harder, but there is no reason for this. The best finish for plastering would be several coats of oil paint, the last being flatted, or mixed with turpentine to avoid gloss; this could then be washed clean with a weak solution of carbolic acid, after infectious sickness, or with soap and water, when it became dirty. The tint can be varied in the different rooms to suit. Of course it will cost much more than papering, but is generally used in hospitals and other buildings, where health is a principal consideration.

The plumbing is usually limited to a sink, occasionally with water connection with a boiler and range, but the farmer's wife is entitled to a more convenient arrangement. A good range is an essential, and is most convenient and cheapest with a boiler on top, as much waste heat is thereby saved. These should be connected with the sink, so as to have hot and cold faucets, and there should be a laundry in a cellar room, best beneath the kitchen, where there is a

hot and cold connection with the range. This keeps the steam of boiling clothes out of the kitchen and pantry and interferes less with the ordinary routine of housework. A bath room is a great comfort, and indeed necessary for health, and should be arranged over the kitchen, and likewise be connected with the range, and a wash bowl should be placed in the same room. These can all be supplied with soft water from a tank in the attic, filled by means of a force pump in the kitchen. About five barrels of water will be required for all these purposes per week by a small family.

A set bath tub with pipes and fixtures costs from $50 up; a wash bowl from $25 up; a range and boiler from $35 to $50; set laundry tubs from $25 up; a water closet will cost from $75 to $100, with soil pipe, water supply, etc., but will require a separate supply tank, pump and source, to avoid danger. It is usually more difficult to arrange and supply in a farm house on account of the quantity of water used, but it is very convenient.

The cost of a proposed house can be pretty closely estimated by determining the cost per square foot of each floor of a similar house recently erected in the vicinity, though farm houses usually are somewhat more costly than if built in a village, as the workmen labor under considerable disadvantages, and generally expect free board in addition to the price usually paid for a similar house in a village. But a plain one-story house ought not to cost over $1.00 per square foot, if in neat style. Very cheaply built houses have been put up in Urbana for 75 cents per square foot by making them square with hip roofs, containing about four small rooms, with no cellar. A two-story house will cost from 75 cents up per square foot of floor, and if hard plaster and oak floors below and hard pine above, natural wood finish be used, it will cost 25 cents to $1.50 per square foot more, according to style and finish, and how much plumbing is put in. A first-rate two-story house with stained or plate glass in several windows, completed plumbing, excellent furnace, concreted cellar under the whole, large cistern, driven well, good drains, etc., can be built complete for $2.00 per square foot of each floor.

The cost of a house is frequently stated to be so much, but this will usually be found to include nothing beyond the bare house, and the necessary fixtures and additions swell the estimated cost greatly, astonishing the owner. They ought to be included in the specified total cost to avoid disappointment.

EXPERIMENTS IN CROSSING THE GRAPE.

E. F. L. RAUTENBURG, LINCOLN.

Mr. President:

The first important point to consider is hardiness, for a vine that does not stand our winters is useless. The second in importance is productiveness. The third, health; for at the present day diseases are conquered or at least abated by spraying. I have said nothing about quality, for tastes differ; some find the native flavor abominable, others very fine, but generally the Delaware is used as standard for quality.

Therefore the first study of the originator should be the parentage of the grape to be employed for crossing in producing new varieties. The less European or vinifera blood the parent vine contains, the less liable are the seedlings to the attacks of the *Phylloxera* or mildew. My first experiment was with the seed of Roger's hybrid, Salem, crossing same with Concord as male. The result is a grape similar in character to Roger's Agawam, but with the fault that it will in some seasons mildew like its female parent. The same seed produced also an extra hardy white grape of fine quality, but before recommending or reporting fully, it will have to be tested as to other qualities. The experiment of sowing the seed of this product resulted in producing almost identically the same grape. This seems to conflict with the theory that seedlings of hybrids will show the blood of either parent, which would be a Black Hamburg or the native fox-grape Wild Mammoth. The same seed produced a black grape like Concord in appearance and as hardy, but in quality like the Eumelan, but not so liable to mildew as the latter.

Leaving Roger's grapes with their vinifera blood alone, I directed my attention to purely natives, the *Labrusca* and *Riparia*, taking at this same time advantage of the experiment of Jaeger, Campbell, Munson and others and especially the scientific treatise on grapes in Bush & Son and Meissner's excellent manual (which by the way ought to be in the hands of every grape grower). Knowing full well that the above named gentlemen, who have done so much for our American grape culture, live in a warmer climate, hence their experiments (except by tests in other latitudes) are confined to their respective locality, and they may well be proud of their success, yet while their results benefit more the peculiar location southward, very little has been so far achieved to produce a grape of general cultivation like the Concord; which with all her faults stands to-day as *the* grape. But this variety is so generally planted that when my Concords are ready for market, my neighbor's and everybody's are, consequently the market is glutted and prices two cents per pound, while a good white or red grape would bring from five to ten cents.

Now to produce a grape by hybridizing or crossing that at the

same time unites the qualities of the Delaware and Concord, spreading over a long season, would be the climax of any amateur's ambition. With this object in view, I crossed Ives, female, with Rommel's Faith, male; from that cross has come the following:

No. 5, or Cleopatra; extra early, much earlier than Hartford; enormously productive and hardy; healthy; the most peculiar foliage, resembles a soft maple leaf; quality poor—nothing but earliness to recommend it, but in other localities may be a success.

No. 6, Hatton; black, hardy, healthy grape; like Telegraph a good keeper; bunches medium, very compact, ripening a little after Concord; quality good, better than Concord or Telegraph.

No. 7, Amalia; is a fine grape of the quality of Rogers 39 (Aminia), black, healthy and vigorous, hardy as Concord. It remains to be seen what the results of the tests as to different localities will be, for no one can safely recommend any new grape unless the same has been thoroughly tested in all localities and under all conditions, which means a long time.

The Concord having the reputation of being the best all round grape, many attempts have been made to grow seedlings or to cross the same with foreign varieties. Such product is the Brighton, produced by Jacob Moore of Brighton, New York. Knowing this I concluded to sow the seed of the Brighton, which, excellent as it is, does not keep long and loses its flavor when overripe. The result was almost a reproduction except that its seedling which I named Bismarck, is not as tender in bud, and the fault of getting mushy does not appear.

I see that others had the same experience. The flowers of the Brighton are not perfect and don't always set fruit; but if a male wild grape is planted near, will pollenize, so much so that often double bunches are produced with clusters well filled. The same holds good with Eldorado. If the wild grape should bloom too early, one of a later blooming variety should be chosen or the buds pinched out; this will retard it, making it bloom on the laterals.

A surprise to me was the cross of Woodruff, female, with Rommel's Etta, male. At first I supposed the plant to be a male, as the flowers dropped off the first season. The next winter was extraordinarily cold and most of my grapevines suffered, yet this young plant remained sound and it bore a few clusters the next season which proved to be of excellent quality; not a trace of foxiness for which the Woodruff is so renowned; it is very early, ripens with Faith, and keeps fresh a long time; color white or transparent green, seeds small and very few; have not yet tested it as to its propagating quality—for the Woodruff does not root easily, but the seedling, which I will now name "Tennyson," may not have that fault.

Mr. Copley of Stapleton, New York, has crossed the Telegraph with Black Hamburg, producing some very fine results.

About chance seedlings; I should advise to keep an eye on them; they may prove very valuable, like the "Chicago" which I found growing here at Lincoln on the street proves to be a fine red grape which stands shipping very well and is a long keeper; bunch medium to large, often double; skin thin but tough; berries hang very tightly on the bunches; seeds small and separate easily; quality best, very sweet and rich; but before I recommend this for general cultivation I want to have tests made elsewhere. So far it exceeds my expectations. It gives what I have sought for at much expense of time and labor. That which I tried to produce by crossing, I found growing in the street, costing me only the time to take it up. The parentage points to Labrusca.

I do not approve of increasing the already long list of grapes. It is a peculiar habit of this fruit that it will do very well in one place and fail entirely in another, hence reports in catalogues, etc., should be judged with care. Even the reports of experiment stations can only apply to the particular location. For instance the Telegraph does exceptionally well with me, while at Champaign it failed. I consider it a very valuable grape for this locality and shall try to cross it with some other good early grape.

The Goethe does well with me, while at Champagn it is not recommended. Norfolk is another very early fine grape, does well here, while at Champaign it does not do well; true, it will mildew in some seasons, but its fruit gets ripe before much damage is done. One thing remarkable is, that Norfolk seedlings don't show a trace of mildew, evèn in the worst possible season; on the other hand some seedlings of Concord crossed with Centennial showed some mildew, while both parents are exempt.

In order to save time, I graft the young shoots on the old vine, thus getting fruit the third year from séed. I employ the herbaceous mode of grafting. The joints should be covered with grafting wax. In a short time the bud on the scion will commence growing, after which by degrees remove all the growing shoots not belonging to it, and in course of the summer you may cut off the old wood above the upper end of scion. A weak grower like Delaware grafted on the wild grape in this way produced a large crop the second year—taking on thrifty growth from the stock. In this manner I test new varieties or seedlings which otherwise would take years.

Northern Muscatine should make a good cross with the Post Oak grape (*Vitis lincecumnii*). The value of the latter has been brought out by Munson's crosses. The Æstivallis blood is not to be recommended, though some excellent grapes like Eumelan are of this class, but mildew gets the best of them. Crossing our wild *Riparia* with the cultivated grape ought to bring good results. I have crossed a wild male grape with Salem and will probably be able at the next meeting to report results.

One often sees statements about weight of bunches; most of them seem mythical. In my opinion a bunch that weighs one-half to three-fourths pounds may be called large, while one and one-half pounds is seldom if ever reached except beyond the Rocky Mountains or under glass.

Manures, the grape hardly ever needs in our alluvial soil, yet a dressing of wood ashes, soapsuds and soot is very beneficial. By no means should stable manure be used unless it is well rotted. In conclusion I will say that in crossing for new varieties, I would employ natives in preference to foreign grapes. The *Labrusca*—such as Concord with *Riparia*—like Etta or Clinton, or grapes of the cross blood.

THE HORTICULTURIST AS A BUSINESS MAN AND THE BUSINESS MAN AS A HORTICULTURIST.

C. N. DENNIS, HAMILTON.

Mr. President;

The average horticulturist is, as a business man, a failure; or if not, he deserves to be, for the reason that he does not conduct his business on business principles—in fact does not know whether he is making or losing by any special part of his operations. Since having this subject assigned me, I have asked several if Horticulture paid, and but one gave me a positive answer, and his reason was that he had begun with very little capital, and if it had not paid, he would have "busted."

The horticulturist, if a business man, would (or should) know the cost of his plant, cost of labor required, what fertilizers used each year, when and how applied, cost of tools and packages, expense of gatheriug and shipping and commissions. Contra—amount of fruit and price received from sales, the amount consumed and value thereof. Then he can strike a balance and *know* on which side the balance lies. This continued for say ten years, he can say quite positively that it pays or that it don't pay. Again each branch should be debited and credited with its own individual expense and income, so that it may be continued or not as to which side the balance lies. He should keep a record of what insecticides and fungicides were used, what strength and when applied, condition of the weather following, etc.

I doubt if one in five hundred of those in Illinois who raise as much as ten acres of that king of fruits, the apple, can tell how much his orchard cost the first year planted, or what it has cost the past season and the income from it. But the kernel in the nut is to do the right thing at the right time, and to do this it must be sys-

tematized. To illustrate, Mr. A. says: I applied bone and meal and dry slaked lime to my orchard in the spring; don't know the result. Mr. B. says: May 15 applied 500 pounds bone meal and 1,500 pounds dry slaked lime mixed, to half my orchard; leaves more glossy, apples higher colored; October 15, applied 500 pounds bone meal, 500 pounds wood ashes; will note the result next year.

The average horticulturist does a large amount of hard work in a haphazard way, trying experiments without keeping any tab on them, any check rows or parts to compare with. And in all is without true business methods. One informed me he did not have time to keep records. Perhaps if he kept more records he would have more time.

The business man when he goes into Horticulture generally has some well-defined object in view. He is either a business man who has means and desires something for a relief from office cares, or else is a lover of Horticulture for itself. In either case he is willing to bestow means and business attainments to reach the desired end. If a business man, and is seeking relief from office cares, where he has been in the habit of striking a complete or partial balance every day, he will decide how much to put into his scheme; he will invest it in a business manner, and what he does, do well, and if he finds any part paying a good profit, either in cash or pleasure, pushes it with money, brain and muscle either by himself or by proxy to approximate perfection.

The enthusiastic lover of Horticulture gives his best thoughts and ability to his loved and chosen occupation, well knowing that what if worth doing is worth doing well; he soon learns that brains have as much to do with success as muscle and that there is no royal road to success without either. Therefore he watches the growth of different varieties, the effect of different modes of cultivation, adopting the best and securing the best results; uses nice clean packages, notifies his commission men what to expect, and thus obtains the best prices, and gives his observing neighbor an object lesson, which he would do well to follow. It is in these two classes of horticulturists that we find some of our best experimenters and most successful growers.

DISCUSSION.

Mr McCluer—In going about it has seemed to me that wherever I have found a man who has been successfully engaged in some other line of business and has taken up farming or fruit growing, he has been more successful than the average man who has had only the experience of the farm. The business training which a man gets

at his other work seems to make him more capable of business success on the farm.

The election of officers for the ensuing year resulted as follows; President, Henry Augustine, Normal; first vice-president, Chas. G. Winn, Griggsville; second vice-president, L. E. Vineyard, Lincoln; secretary and treasurer, G. W. McCluer, Champaign.

On motion the selection of a place and time for holding the next meeting was referred to the executive committee of the society.

THE FUTURE OF ORCHARDING IN CENTRAL ILLINOIS.

H. AUGUSTINE, NORMAL.

Mr. President:

This subject seems to include what there is being planted in our orchards, and where, and what are the comparative chances of success with it As to numbers, I will say simply that it seems to me there are at least six trees being planted to every one that is being destroyed. South, southwest and west of us especially, people are going very largely into planting. There has been a good deal of anxiety expressed lest we should overdo the business, but there is no need to fear, for the States that were formerly so prominent in apple growing are now abandoning the business. In New York and some of the New England States they cannot grow apples as they could formerly on account of the scab and other troubles that have multiplied in their orchards.

The people of those States used to think and the people of Europe still think that only New York and Michigan are capable of growing good apples. But the fact is that these two States, and especially Michigan, are destroying good young apple orchards for the sake of planting peaches. There is more money in peaches. They even talk of 1,800 or 2,000 acres of peaches and plums in a body and under one control.

Like growing corn, the growing of apples or any other fruit goes in belts or localities Apple growing in the north and northwest is not successful and in the extreme south is still worse. While California grows some magnificent apples to look at, they are not good to eat, as anyone will testify who has eaten California apples. The best section that is now known for apples is a little south of us here, and extends from Indiana to central Kansas, in a belt from 100 to 150 miles wide. When it comes to a contest on the markets between the apples of this belt and those from another place these will have the advantage.

As to a market for the fruit that is to be produced in the near future: the apple is one of the fruits that can be sent to Europe and their markets will be open to receive it. The countries of Europe cannot grow apples to be compared to ours, and when they want something that is good, they must come to this country for it. That is a fact that has been recognized for 200 years,

We are learning to keep fruit in cold storage and that, when we can do it perfectly, will make a demand for fruit that is more than a year old. The farmer can then grow his apples and hold them for the off year and a rise in price just as he now does corn. Not all the fields yield at the same time and none of them yield all the time. Men expect too much of their orchards, and get discouraged if they do not get a crop every year. A crop of apples is not as certain as a crop of corn, but when you get it, it is of more value. Two or three good crops in the lifetime of the average orchard would make apple growing profitable. But in order to get the profit, the crop is not all. It must be well grown, fruit perfect and well colored, and it must be carefully picked and graded and last of all it must be sold in a business way.

There is a good deal of talk about hardy varieties when we want to know what to plant. There are many varieties that are just as healthy and hardy as oaks and that will bear well. The trouble is we are not careful enough to investigate and sometimes plant varieties not suited to our locality. Belleflower and Northern Spy are valuable in the north and east, hardy and abundant bearers and the fruit of the best quality. They are hardy here too, but it takes them too long to come into bearing, and when they do begin, they do not bear enough. I cannot do better for a list of varieties for general planting than you will find in the reports of our society.

ORCHARDING—PAST, PRESENT AND FUTURE.

C. G. WINN, GRIGGSVILLE.

Mr. President:

To look at the past, can be of advantage only that, first, we may profit by its failures and successes, and second, that we may account for the present condition of affairs.

Forty years ago when our population in the west was limited and scattered, an orchard of ten acres would have looked larger than one of hundred acres does to-day. Cold storage as we have it was not known until recently. F. Newhall, a commission merchant of Chicago, who was the first dealer who carried apples through the winter, and sold them on the Chicago market in the summer months, did so in a cellar with north and south entrances, opening and closing

it according as the weather was warm or cold. Apples were then considered a luxury. Now they are both a luxury and a necessity and are being grown and used more and more each year. For a good many years farmers have been gradually increasing their acreage in orchards. In 1890 the apple crop east and north of us was a failure. About all of the apples grown were in central and southern Illinois, Missouri, southern Iowa, eastern Kansas and Nebraska. In these localities the fruit being excellent in quality and immense in quantity; the crop in a good many instances bringing $300 to $400 per acre. Then it was that the hopes of the most enthusiastic nursery-man were more than realized. Tree planting was all the rage throughout the regions named. Said a Chicago commission man to me: "Were you to have as large and paying a crop of apples again as you had in 1890, I verily believe that all of South Water street would quit the commission business and go into orcharding." I know of one dealer who has already set out 640 acres in Green county this State as a result of the crop of 1890.

In four counties in southern Illinois it is estimated there are three and a half millions of apple trees set, which at ten years old and with a full crop, would yield over ten millions of barrels for these four counties alone; and this is by no means the total apple area in central and southern Illinois. It is probably not over one-third to one-half of the acreage.

The same may be said of Missouri, Kansas and western Iowa, and I might say Michigan; for in the region of Benton Harbor, fruit is the main industry.

Now the next question is, Is this going to be a paying business? If we may judge by the past, I will say that not over one-fourth of the orchards set out will even pay a profit to the owner. It is true that in the localities named, immense numbers of trees have been set out, but here in central and northern Illinois hundreds of orchards are being cut down to give way to a corn or oats crop. In Massachusetts orcharding is being abandoned. In New York at a recent State meeting it was decided that in view of the competition from the west, further planting of orchards was not considered advisable.

By nature there are certain localities where one kind of crop will do better than in another. Just why, cannot always be told. Now the natural location of an orchard is in a timber soil and the trees will do much better if planted there. I might go further and say that in certain localities certain kinds will do well while in others near at hand and apparently the same they will fail. Take the Winesap apple. In Massac county, this State, it can be grown to perfection, while in this locality it is a failure. Some other varieties that will do well here would in all probability be a

failure there. Then why not say that not over one-fourth of the orchards that are set out will ever pay their owners a profit? First. Orcharding is not a sure crop anywhere. Second. The proper care will not be taken of the orchards to raise high-class fruit. Third. When a large crop is grown the price is bound to be so low that many will become discouraged and quit the business. But I imagine I hear some of you say, "Do you want to discourage apple growing?" Not by any means. It can be made a success where it is not depended on alone for a living; where other branches of farming, like small fruits, vegetables, poultry, corn and clover with hogs are kept upon the same farm. Do not depend on any one thing alone for a living; or in other words don't put all your eggs in one basket.

There is seldom a large crop everywhere. If only two good paying crops can be had here in Illinois in ten years, it will pay as well as, or better, than anything else. In 1890 a New York man came into southern Illinois and bought several carloads of windfall and second grade apples and shipped them to New York and in February he re-shipped a carload of canned apples and sold them in the St. Louis market, thus paying for not less than 1,500 miles of transportation, and still made a profit. Here seems to me to be a promising outlet for our second grade apples, but we want the canning factories right here in Illinois, instead of sending the fruit to New York to have it canned for us and then shipped back. In buying apples, there are certain sections where dealers prefer to get them, and they will buy there if there are apples for sale. The territory, extending 100 miles north and south of this, and as far west as eastern Kansas is one of the best in orcharding.

Recollect that you don't want to neglect your orchard in any event, and don't want more than you can take care of either. If you are going to make money out of a thing, you must have what the man with the money wants to buy. The first thing is to raise apples suited to the market. There seems to be about all the Ben Davis in sight that are needed. I believe the man who can furnish a choice lot of Jonathan, Grimes, Minkler or Willow Twig is all right. Another thing besides the apples is needed and that is a reputation as a grower of high-class fruit. Is there any reason in the world why a barrel of apples branded choice and packed by a well-known and reliable grower should not be sold as standard goods the same as our well-known manufactured goods of special brands? I can see none. It is worth a good deal to a wholesale dealer in apples to know just where he can send and buy apples direct by the carload from the grower, packed in a reliable and honest manner with high-class fruit; and in this alone, can I see any clear sailing for the apple

grower. His reputation must be the greater part of his capital. I once knew a man who branded his apples as choice, put his name on them and then filled the middle of his barrels with inferior fruit. The result was he soon had a bad reputation and his fruit would scarcely sell at all.

WATER AND VEGETATION.

PROFESSOR T. J. BURRILL, UNIVERSITY OF ILLINOIS.

Mr. President:

The average annual rain fall for central Illinois, as ascertained through the reporters for the Illinois State Board of Agriculture, for the ten years preceding 1888 was 38.22 inches. During these same ten years the average for May and June was 9.49, and for July and August 6.20 inches, or for these four months together 15.69 inches.

The records of rainfall by the Agricultural Experiment Station of the University of Illinois were begun during August, 1888. Beginning with 1889, the first full year of these records, we find that for the last six years there fell at this point an annual average of 31.50 inches, or less than the first named period by 6.68 inches. For May and June the average annual amount during the latter period was 7.89 and for July and August 4.12 inches, or for the four months 12.01 inches. That is the average for the later six years for May and June fell short of that for same months in the preceding ten years by 1.60 and for July and August 2.08 inches, or 3.68 inches for the four months. The total precipitation for 1893 was 32.31 inches and for 1894 but 24.71 inches. For May and June 6.38 and 5.08 inches; for July and August .65 and 3.16 inches respectively.

I do not care to make very considerable use of these figures, because it too often happens that deductions made in such matters go wide of the mark. It is shown, however, that recent years have been comparatively dry years, as indeed all are aware. The rainfall for the four summer months named during the two last years does not equal the average for one year in the ten-year period spoken of. This in itself is enough to attract our attention and to give reason for the discussion upon the subject of water and vegetation.

It will only be uttering what everyone knows, when it is said that plants are very closely dependent upon a sufficient supply of water for their life processes. Probably it will be little further from accepted knowledge by all, if it is said that this dependence is as true for plants as it is for animals, though individuals of one or the other group may longer exist in a healthy condition without imbibing the fluid. Water, in a pretty nearly continuous supply, is essential for both plants and animals. For those, it must be brought to them; these, may go in

search of it. For plants water is necessary for food supply, for the saturation of their tissues and for the distribution of soluble substances, while animals use it for the two latter purposes only. Plants must starve without it as well as suffer from a too meagre amount in the tissues. The food proper of animals does not include water; hence, it seems that while water is essential to both classes of living things, it is for plants rather than animals that we must especially count it necessary.

All of the higher plants, such as we cultivate, take in water only by their roots. It is sometimes thought that leaves absorb moisture from the air; that at all events the dew of night time is so absorbed. But careful experiment shows this to be untrue. Plants, indeed, do revive at night from the wilted condition sometimes observed during the daytime. So, too, wilted plants may revive when the leaves are sprinkled with water, though not a drop of it reaches the roots. But these results only follow when the roots are taking in water and simply mean that, through checking the escape from the leaves, the root-water becomes sufficient for the needs of the plant. The same thing occurs and in the same way when flagging plants are covered with a bell glass without adding a drop of water to them.

Then the water supply for plants must come from the soil. The amount required will be more or less on account, principally, of the greater or less quantity evaporated from the parts above ground, mainly from the leaves, and this will depend again upon the characteristics of the exposure, the relative humidity of the atmosphere, whether or not it is in motion, etc. Other things being equal the evaporation is much greater upon a very warm day than when the temperature is lower. Some plants resist this evaporation from their tissues much more than do others in accordance with the amount and quality of their exposed surfaces. Plants with a large surface exposure, especially of thin leaves, give up astonishingly great quantities of water in favorable weather, while forms like those of the cactus species retain most of their supply. Plants have large thin leaves for the very purpose of exposing to the air a great extent of superficial area, but not for the purpose of sending out watery vapor; this latter is a secondary consequence which would be prevented if feasible. That plants do not need such transpiration from the leaves is shown by their remarkable vigor and healthfulness in glazed cases in which very little evaporation from the leaves occurs. Their large leaf exposures are, first, for collecting the carbonic acid of the air by absorption, and secondly, for the favorable influences of the sunshine on what is known as the process of assimilation, or the conversion of the elements of water and of carbonic acid into organic matter, usually starch, which then becomes nutritious both for the plants themselves and for animals. This assimilation in the green tissues under the stimulus of sunlight is so imperatively important that the unwelcome exposure to evaporation

must be endured, hence the great leaf-surface formed with only such protection as comes from the cutinized epidermis. Plants with little leaf-surface and thick cuticle are slow in growth just as some animals, like turtles, which eat comparatively little are also of slow growth. In this sense a thin leaved full-foliaged tree is like a young bullock, having great capacity for food gathering and assimilation.

Experiments on potted plants show the amount of water which escapes from them under the varying conditions of temperature and of the atmosphere, as well as the difference in this respect between plants of different kinds. It is only necessary to prevent in some way all loss of water from the pot and the surface of the soil, when the difference in the weights taken in the morning and evening shows the loss of water through the plant itself during the day. It is easy to determine in this way that plants lose more water when placed in the sunshine than when kept in the shade; more during a clear than a cloudy day; more when in moving than in still air, and proportionally more when the leaf-surface is greater, etc.

Taking a general average for many thin-leaved plants and for clear summer weather, it has been ascertained that one and one-fourth ounces of water per square foot of leaf-surface escapes each day of twelve hours. Then the total loss during such time under such conditions from any given plant is one and one fourth ounces multiplied by the number of square feet of leaf-surface. In obtaining the latter both sides of the leaves are considered and enter into the account. A plant having a little over twelve square feet of such exposure will lose about sixteen ounces, or one pint of water, and one having one hundred square feet will send into the air about one gallon of water.

A large sized forest tree has about 200,000 square feet of leaf-surface, hence at the same rate will loose 200,000 times one and one fourth ounces or 250,000 ounces, or (sixteen ounces to the pint) 15,625 pints, or 1,953 gallons, or forty-eight barrels of forty gallons each. This, in other words, is seven and one-half tons, or about as many wagon loads. This amount is so enormous that we must not conclude from our experiments on potted plants that the results hold essentially good for a large tree, but the very enormity of the amount will serve to arouse attention to the subject and to prepare us for the exceedingly large amounts which certainly do evaporate from vegetation in general, whether or not further experiments upon trees confirm the results obtained as above. From a similar basis it has been estimated that from an acre of corn or of clover about 20,000 gallons of water escape through the foliage on each clear summer day, and as we may count upon about one hundred such days during the season we have 200,000 gallons for the summer. Now as there are 231 cubic inches in a gallon, we have 46,200,000 cubic inches in this amount of water, and as there are 6,272,640 square inches in an acre, we find that the water represents 7.32 inches in depth over the sur-

face. The enormous aggregate amount as figured in gallons seems to be wonderfully less when estimated as we do depth of rainfall. It is now well to recall that even in the dryest years for which figures were given above, we had during the four summer months enough of rainfall to supply such crops providing it was not lost some other way. As our soil may hold, in the first two feet, from fifteen to sixteen inches of water, it is plain that we usually have enough moisture stored in the soil at the time of spring planting to mature any of our crops, provided, again, it is not lost in large quantities in some way besides escaping from the foliage.

Before addressing ourselves to the problem evidently springing from this, viz., the best methods of preservation of soil-water for the uses of plants, I invite your attention to a somewhat closer study than the subject usually receives, of the means by which water is absorbed both by soil and plants, and how it is given up. We hear very much in discussions of this kind about capillary attraction, and phenomena are supposed to be rationally explained when it is said that they are due to this asserted force. Reference is made to the well-known fact that water in small tubes rises higher than the water level outside of the tubes. When this was first observed it appeared to the investigator that a new kind of force had been discovered, and a special name derived from the hair-like opening in the tube was given it. But this rise of water in a fine tube is caused by the very same force that causes some water to cling to most materials and wet their surfaces. This again is the same thing that caused Newton's apple to fall to the ground, and the same that holds the earth in its orbit around the sun. Newton's law, that every mass of matter in the universe attracts every other mass, is as true for small and even minute bodies as for large ones; and his other law also applies to both, viz., that the attraction varies inversely as the square of the distance. That is, the attracting force is four times greater at one-half a given distance, sixteen times greater at one-fourth the distance, 256 times greater at one-sixteenth the distance, etc. When we deal with small bodies and with minute distances the effects of this law, though not so demonstrable, perhaps, are still more instructive than in the case of large bodies and great distances. Very small bodies have, according to the first law, very feeble powers of attraction, and practically nothing through any considerable space. It often happens that such bodies do not ordinarily become closely enough associated to adhere at all by this means, as when flour retains its powdery characteristics unless the spaces between its particles are filled with some fluid substance; but great pressure applied to the dry material makes a permanent solid of wonderful hardness; so picture, and other frames are made out of sawdust by the simple process of compression. The formerly loose particles of the sawdust are now

brought so close together that their attractive forces are engaged and the mass is held thereby together permanently.

Now water is made up of minute solid particles called molecules. The substance is fluid, that is, free to take any shape caused by external forces, because these excessively minute particles do not approach near enough each other to be held through attraction, but they may so approach and in that case we have ice. They may also easily come within the attractive range with other substances, and that does take place in contact with glass. The smaller the tube the stronger is this attraction, simply because the space is less. But a tube no better illustrates the phenomenon than do two flat pieces of glass pressed close together. If I fill a small glass tube with very fine sand I shall see the water rise much higher than it does in the tube otherwise. The finer the sand the higher the ultimate level of the water will be. The attraction of the earth (which, though the very same thing as that operating in the fine tube, we call the attraction of gravitation) tends to pull the water down and it will not ascend save as it is pulled with greater power upward. But when the spaces through which the upward force is exerted are small enough, the downward pull of the earth becomes comparatively insignificant, and the fluid may rise to any conceivable height. In this way water is drawn from the soil by the roots of trees and sent upward to the highest tops, even to those of the California redwoods, 400 feet high, as readily as it moves the first foot.

It must be thoroughly understood that plants have no pumping apparatus similar to the heart of animals. There is nothing of a circulation of sap in plants at all comparable with the course of the blood in animals. The water is taken from the soil molecule by molecule and penetrates the solid surfaces of the roots in the same way, and, by the same process continues to disseminate in the plant structures in the direction up, down or laterally as the case may be, from the place of supply toward that least approaching saturation. If there is loss of water from any part, toward that part the movement will take place. In plants it is lost by the leaves through the same attractive force, but existing in this case through the particles of water and those of the air. If the tissues of the plant are all equally saturated no movement except perhaps through external causes of the fluids can take place. The moment, however, loss of water takes place from any part, re-adjustment forthwith commences in the tendency of water towards that part and the re-establishment of an equilibrium. Since the supply is from the roots and the loss from the leaves, the great movement is upward.

Acting along with this main cause of the movement of water in plants, other forces cause some of the phenomena we observe, as when from a maple tree sap runs better after a frosty night when the sun warms up the trunk. In this case the air in the tissues condenses at

night and allows further ascent of the fluids; then as the air expands upon heating, a force is exerted toward pressing the liquid out of any outlet. But for our purpose we may say that the water is taken from the soil and sent up through the plant by the normal attractions existing between the particles of water and those of the plant tissues. In the soil the water is held and distributed by the operation of the same force existing between the water molecules and the elements of the earth. Different varieties of soil hold in this manner varying amounts of water, depending in good part upon the state of division of the earthy particles and their relations towards each other.

Our cultivated plants do not thrive with liquid water about their roots. The molecules of water must be attached to particles of soil and being so held the liquid quality is lost. They are not free to move. In order that the roots may pull away these water molecules from their soil attachments, the closest contact is required. The root surfaces must bear hard upon the soil surfaces—get close to them in the sense that the sawdust particles are close together when put under hydraulic pressure. This can only occur when the soil elements are themselves close together, and when the roots push their way forcibly between them. Soil recently loosened up by the plow is in no condition for the growth and function of roots, but at the same time soil not in a state of fine division is unsuited for plant growth. A certain compactness is required as much as is a certain content of water.

In no case can a plant take all the water from soil. Something like ten per cent of the weight of the dry soil is held so firmly that the roots cannot pull it away, but such soil is apparently very dry and in most cases is also very hard. There is however a quantity of water in our common soils of Illinois varying between fifty and ten per cent of the dry weight of the soil that is available and may be utilized by our cultivated plants. If we can contrive to save this in good part for the use of the plants, little fear need be entertained of drouth with us. To this subject we therefore now return.

In the first place it ought to be stated that no water held by the soil attractions as described will ever escape by drains, while drains will usually leave the soil itself in better condition to hold water by absorption, because standing water tends to consolidate it too much for the best absorptive condition. It is a common observation that tile-drained soil resists drouth better than the same soil undrained. This has also been proved by careful tests made by exact determinations of the amount of water in drained and undrained soils during times of drouth. Since our soils receive water enough each year, and more than enough, for the uses of crops, we need not fear draining off any extra supply.

The use of barnyard and some other fertilizers tends to put the soil into a better physical state for retaining moisture, and often may be of more service in this way than through any contributions to the

soil elements. Some lands need occasional deep stirring, best done as a rule in the autumn so that it may again sufficiently settle into the required closeness; but subsoiling with us need not be practiced more than once in ten years in ordinary cases. Deep plowing in late spring time must always be considered hazardous.

But the most dependence in case of cultivated land must be placed upon the summer treatment of the surface. Mulching with straw, sawdust, etc., is well known to be effective in conserving the soil moisture; such mulch does not attract or bring moisture; it preserves that which is already existing either in the surface soil or in the deeper layers. Therefore to be effective, mulch must be applied before the soil loses a sufficient supply, not after this is gone and there is nothing to save. The only practical substitute for such substances as mulch is usually a layer of dry earth. Much benefit is easily observed from frequent surface cultivation. This has become a settled doctrine if not procedure in our best agriculture and scientific tests have shown that under similar conditions otherwise uncultivated bare soil loses twice as much by evaporation as does well cultivated land. The difference may easily equal two or three inches of rainfall in a month.

Practice in this case as in so many others, is ahead of science, and, as usual again, practice has not reached the full scientific possibilities. Why surface cultivations preserves soil moisture is not generally understood. It is very common to shake things up when it is desired to hasten drying. Why should earth be stirred to prevent its drying? A tedder is a good thing in a hay field. Why is a soil tedder desirable?

The usual explanation is that cultivation breaks the capillary connection in the substance of the soil and so prevents the rise of water to the surface to be evaporated there. The fact is, however, that the hay tedder and the soil tedder (cultivator) performs similar functions. The loosened earth does dry out faster on account of the stirring, just as surely as green grass does. And furthermore, the dryer the stirred layer of earth the more certainly does it prevent the escape of the water in the layers of soil underneath. Every one knows how blotting paper, which when thoroughly dry, resists wetting with water or ink at first; but when slightly moistened, as by holding it a moment in a jet of steam, it greedily and instantaneously absorbs a drop to which it is touched. A thoroughly dry towel is less effective than one somewhat moist. It is, in good part, because a shallow layer of earth does dry out rapidly when stirred that it is effective as a mulch, and the better the condition for rapid drying the better the protection. The stirred layer does not absorb moisture from the air and contribute it to the soil. It loses its own moisture and continues to take more or less from below only to lose it again; but the amount is always small compared with that from unstirred soil and varies greatly on account of the state of tilth. Practically in the fields it must be the finest possible, so

that the air cavities it contains may be closed cavities; so that, too, all its particles may be most thoroughly dried out. A wet mulch is a contradiction of terms and a confusion of ideas. The condition the mulch layer is in, counts for more than its thickness. Indeed it is suicidal to stir the ground deep in a dry time. It aids further drying. One inch of finely pulverized soil may be considered sufficient protection for any length of time during which it remains dry. If wetted by rain the next day after the stirring its value in this respect is gone and needs stirring again as soon as thorough pulverization can be accomplished. To stir earlier would be wasting labor; to delay longer because the work was recently done is puerile and expensive. It is possible that without rain the stirred layer may become so compact again that stirring is a second time necessary, but so long as this inch of soil remains fine and dry, distinct from the next adjacent soil, it may be considered efficient without restirring. In other words the number and times of surface cultivation should be made to depend upon the condition, not upon routine or what has proved best under other conditions. If one has not knowledge and experience enough to determine by examination, he must keep going and trust to fortune; but the day is approaching when intelligence and scientific application of knowledge will alone succeed in agriculture and horticulture. We know vastly more now than did our forefathers about these things, but the heaviest taxes we now pay are assessed by ignorance and the accompanying follies. We cannot control the rainfall. We may save water sufficient unto the needs of our crops.

PRACTICAL BOTANY IN EXPERIMENT STATIONS.

G. P. CLINTON, ASSISTANT BOTANIST, STATE EXPERIMENT STATION.

Mr. President:

I doubt not that many a person has questioned the need, or at least the practical value, of the various institutions known as experiment stations that, under state and national aid, have sprung up with such vigor during the past few years. They are placing agriculture on a scientific basis. Perhaps some may think that science is the opposite of utility, but there can be nothing more useful than a truly scientific method, and nothing more useless than an unscientific one.

Recently going over the two thousand or more publications that have been issued by the fifty-five stations of this country, I found that about five hundred contained articles or notes of botanical interest. Very important discoveries of a practical nature have been comparatively few. The work that has been done falls under the following six heads: 1. Contagious diseases of animals. 2. Diseases of plants.

3. Bacteria in the dairy. 4. Bacteria and free nitrogen. 5. Weeds. 6. Pollenization and cross-fertilization. Each topic is so wide and, in some, results so significant have been reached that I can do little more than mention their most salient features, and give the practical applications to be derived.

1. Contagious diseases of animals are in most cases known or supposed to be caused by the lowest forms of plant life known as fungi and bacteria. Of animals attacked by fungi, insects seem to suffer most, although lumpy-jaw of cattle and a destructive disease of fish are due to these forms. A good deal of attention has been attracted of late to the fungous diseases of insects because of the work that has been done at Lawrence, Kansas, and by Professor Forbes of the station here on a fungous enemy of the chinch bug. To make this of economic importance wholesale infection of bugs in the fields has been undertaken. To judge from the reports in Kansas, these operations seem to give unusual success, but so far the experiments here have not shown much merit for the process, though, perhaps, the weather conditions have not been so favorable for the spread of the disease.

Diseases of animals caused by bacteria are now coming to be quite well understood, and to the German and French investigators is due large credit, especially for our knowledge of those forms producing disease in man. Considerable has been written in the experiment station bulletins concerning some of the more virulent of the contagious diseases of cattle. Perhaps none of the diseases of animals has a more direct effect upon man than tuberculosis of cattle, since it is said that consumption in people may be acquired from this source. Of late the experiment stations have been pushing a new test for the determination of tuberculosis that is said to be more acurate than the examination by an expert veterinarian. It consists in the inoculation of animals with a certain amount of Koch's tuberculin lymph. Although this has failed as a specific for consumption, it has the merit of showing whether any sign of tubercular trouble exists by raising several degrees the temperature in the inoculated subject while, if no stage of this disease exists no, or but little, rise of temperature follows. Such methods employed at several stations, have shown rather wide spread tubercular trouble in some of the inoculated herds of cattle, and postmortem examinations of those animals killed for the experiment have proved the accuracy of the test. Thus with increased knowledge must come increased responsibility, greater care, better sanitary conditions, with great benefit to both beast and man as the result.

11. Probably the most work in the stations has been upon diseases of plants; while pure physiological diseases, or better, derangements, have been investigated but little, those due to the

action of fungi have had careful and abundant attention. To the labors of the division of vegetable pathology department of agriculture, is due most credit for introducing and popularizing spraying as a method for combating injurious fungi. While spraying for such enemies probably originated in France, this country at present is said to make more use of it than any other. Of no effect in preventing certain of these diseases, of uncertain value in others, still, as a general rule, when the applications are begun early enough and are systematically applied during the disease contracting season, most of these fungous troubles are in part or wholly prevented by this treatment. Perhaps apple scab, black rot of grapes and potato blight are three of the most common and injurious of these diseases. Much of the experimenting has been with these pests, and the results in some seasons have been of the most satisfactory kind. It seems to me that intelligent spraying against black rot of grapes must be of decided value to any one who raises grapes for profit. Out of the mass of material thus brought to light by experiments with fungicides, Bordeaux mixture has come as the champion. Weaker and cheaper solutions have been found as useful in most cases as the strong ones first employed. Last but not least, the opportune time for spraying against each disease has been found of great weight.

Another method for the prevention of disease in plants is what is known as seed treatment. The so-called hot water treatment was practically first tried in Denmark for the prevention of smut in cereals, and later was introduced in this country by the Kansas Experiment Station. Water of about 135° Fahr. is used in which the seed is soaked for a short time. The temperature is sufficient to kill any adhering smut spores without injuring the treated seed. Experiments along this line have given oats and wheat, when thus treated, practically free from smut. As these usually have from five to fifteen, and occasionally even a much higher per cent of the grain destroyed by this fungus, the advantage of treatment can readily be seen; but it is claimed that treated seed gives a yield above that merely due to the loss from smut. Another seed treatment lately arousing attention is the corrosive sublimate treatment of potatoes for the prevention of scab. Professor Thaxter, while of the Connecticut Station, proved that scab was the result of a fungus which he obtained from diseased potatoes, and with which he infected healthy ones. Professor Bolley of North Dakota found that soaking seed for a short time in a weak solution of corrosive sublimate and planting the seed so treated on uninfected land, gave potatoes practically free from scab. Experiments at the station here and elsewhere confirm these results.

III. Of such importance as foes to man in the case of infectious diseases, it has also been found that bacteria are among our most beneficial allies. Perhaps the housewife little knows why the milk sours, or why the butter is sometimes rancid. Investigation of these subjects have shown that bacteria are very important agents here. Perhaps Denmark has reached the highest perfection in the dairy and allied industries, and her success is due to the science that is employed in her methods. Their butter of a uniform good flavor and aroma is no longer a question of uncertainty. Many species of bacteria are found in milk and its products. Some of these, as in butter, give a good flavor or aroma, while others give the opposite effects. It is then a matter of importance that certain forms shall predominate so that good butter may be had. In Denmark and Germany considerable work upon this subject has already been done, while in this country Dr. Conn, in a general way, has done work for Storrs' Station of Connecticut. It seems only a matter of time before bacterial methods shall become a part of each well regulated dairy industry.

IV. The beneficial bacteria are not confined to the dairy Each day they are doing us service by increasing the fertility of the soil. It has long been known that clover and allied plants instead of wearing out land are the best crops with which to rest it. Only of recent date has the real cause for this been discovered. If one were to examine the roots of such plants carefully, he would find scattered on them little gall-like bodies called tubercles. It has been found that these are produced by the action of certain bacteria on the plant tissues where the two live in mutually helpful relations. Nitrogen is one of the most needed of elements for plant food. It is found in the earth in combination with other elements in a state to be used by plants, but in such quantities that it can readily be exhausted by too vigorous use of the land. In a free state it exists in the atmosphere forming its great bulk, but in this free state plants cannot make use of it. It is here the bacteria found in the root tubercles perform their duties to the host by taking from the air this free nitrogen and combining it in a form so that the plant can use it. Such plants as these, then, have an advantage over ordinary plants, especially when the soil is lacking in nitrogen. It is the taking of but a small amount of combined nitrogen from the soil directly and the leaving of a considerable amount of it in the soil by the decay of their roots or by the whole plant when plowed under that makes clover and such plants beneficial to worn land. Much of the work on this subject is the result of European investigation. In this country the station at Storrs, Connecticut, has done some work along the chemical side of the question, and at the station

here some investigations have been attempted to use these discoveries along more practical lines. The question is one that has caused much discussion, and has had investigation by the foremost scientists of the time.

v. Generally recognized as foes to the best development of agriculture, it is quite hard, nevertheless, to estimate the real damage caused by weeds. A number of experiment stations have made this subject of weeds prominent in their botanical investigations. Perhaps no one weed has caused more damage or has been more widely advertised than the Russian Thistle. It is of double interest to us because of its recent discovery in the northern part of the State, although it is now certain that the supposed salwort that has slowly been spreading at the foot of Lake Michigan during the past twelve years is this same Russian Thistle. Already introduced in some thirty reported localities, in two cases it has become quite abundant. So far seven States have issued illustrated bulletins upon this pest, which has already spread into twelve States. United action has thus been aroused, information spread, and laws passed not only concerning this invader but also concerning other noxious forms. Among other injurious weeds that have received attention are the loco weed of the west which, when eaten seriously, affects stock, and squirrel tail grass which by its barbed awns is said to produce ulceration in the jaws of cattle that eat it abundantly.

vi. Imperfect pollenation is gradually becoming to be understood as one of the reasons for failure of crops. Investigation of this subject, determination of favorable and unfavorable influences, and study of effect by fertilization of pollen from the same and different individuals must of necessity bring forth facts of great importance. Perhaps the paper of Waite of the Division of Pathology, Washington, on Pollenation of Pear Flowers is the most important work in this line that has yet been issued in this country. In this investigation was brought to light the utter inability of certain kinds of pears to fertilize their own blossoms, such requiring pollen from other varieties. Another subject closely related to this is the improvement of varieties of plants by cross fertilization. This is a work in its infancy and yet with results already attained in some stations that augur great reward to the careful investigator of the future.

Such in brief describes the more practical work that has been carried on in the various stations. It might seem that time would exhaust the subjects of research, but so marvelous is the science of nature that the more boundless is her realm revealed as the more critical becomes the search of her investigators.

PRUNING GRAPEVINES.

A. O. HOLLENSBE, CHAMPAIGN.

Mr. President:

When the ground has been well prepared by deep plowing the previous fall, and the plants set in rows eight feet apart each way, you are prepared to set your posts for the trellis system, or stakes at each plant for the single stake system. For the trellis, plant a good sized post at each end of the row and have them thoroughly braced so that in stretching the wires they will remain in place. At intervals of sixteen feet between the end posts set other posts. On these posts stretch three or four wires on which to train the vines.

For the single stake system take a crowbar and make a hole for the stake close to the crown of each plant and in this hole plant an osage stake which should be long enough to stand six feet above the ground when set, about this one or two canes are wound and tied securely at the top with twine.

Trim vines in the fall of the year as soon as the leaves have fallen. Never trim late in spring, because the vine will lose sap which generally starts with the first warm weather in March.

For the trellis system trim new growth back within three or four buds of the old cane and tie these stubs to the wire. It is best however to let the vine lie on the ground until spring after trimming same, as they will be less liable to injury during severe winters.

In trimming for stakes, one or two canes of the previous year's growth are left on each vine. These are wound carefully but firmly about the stake and tied at the top with twine. A half-dozen buds are left at base of plant and they will develop canes for the next year. When possible renew canes every season; but if no canes are of sufficient length the canes of the previous year may be spur-pruned by cutting back the new growth to two or four buds.

LIST OF OFFICERS

AND

PROCEEDINGS

OF

COUNTY HORTICULTURAL SOCIETIES

Reported by the Secretaries of Same.

WARSAW

HORTICULTURAL SOCIETY.

OFFICERS FOR 1895.

PRESIDENT, - - -	James T. Johnson, Warsaw.
VICE-PRESIDENT, -	L. S. Dennis, Warsaw.
SECRETARY, - - -	Homer D. Brown, Hamilton.
TREASURER, - -	C. C. Hoppe, Warsaw.

REPORT OF SECRETARY.

HOMER D. BROWN.

Mr. President:

March meeting was held in Warsaw, Ill. Good attendance. Following papers were read: "The Rose," by General O. Edwards, Warsaw; "Early Gardening," by C. C. Hoppe, Warsaw; "Orchard Planting," by C. N. Dennis, Hamilton.

Discussions on above subjects were in order, but the rose seemed to be the favorite, as the ladies were on hand and gave us some good ideas in regard to caring for the queen of flowers. Early gardening brought out a lengthy discussion; also the planting of orchards. Secretary was ordered to make out a yearly program and to call meetings when he thought best, making about four meetings during the season.

August meeting was held at juice factory of George V. Stevens & Co., on the banks of the Mississippi River, and a large crowd was in attendance from Carthage, Hamilton and Warsaw. President Johnson being absent Squire Piggott was called to the chair. The Floral Society ladies then took the program in hand and we had free entertainment for several hours. Essay by Mrs. Rose Connable, presi-

dent Monte Bello Floral Society. Recitations by Mrs. Frothingham and Mrs. Sack, of the Warsaw Floral Society, also recitation by Miss Lotta Jones, Hamilton. This part of the program being over the music people adjourned to the parlors of Mr. Stevens and had a fine program by Prof. Cook and others. Meanwhile the old members had short sessions in regard to exibits at fairs, etc.

Fruits on exhibition as follows: Moore's Early grape, Vicer and Clapp's pear, also two apples for name, by C. N. Dennis. Tomatoes, weight two pounds: Boudrosa, Crimson, Cuision, Fordhook, exhibited by C. C. Hoppe. After meeting adjourned Messrs. Stevens took the crowd through their plant. The cellars under the bluffs were the most attractive, unless it was the grape juice indulged in by all the crowd. The meeting closed with a unanimous vote of thanks to Messrs. Stevens for their hospitality.

December meeting at Warsaw. Papers, by L. R. Bryant, "Outlook for Apples and Cider," was read by secretary, also other papers. Every one seemed encouraged in regard to apple prospects for 1895.

President Johnson's annual address well received, also report of secretary and treasurer; especially the latter, as he reported full treasury and recommended that no fee be charged the old members for the coming year, which recommendation was unanimously adopted. Election of officers resulted in retaining old Board. Adjourned to meet in Warsaw last Wednesday in February, 1895.

HORTICULTURAL SOCIETY

OF

MARION COUNTY.

OFFICERS FOR 1895.

PRESIDENT, . . .	J. G. Vaughan, Odin.
VICE-PRESIDENT, . . .	B. C. Warfield, Sandoval.
SEC'Y AND TREAS., . .	E. G. Mendenhall, Kinmundy.

The Society held a summer meeting at Sandoval on Saturday, May 26, 1894, at which there was a good attendance of members and citizens. In connection with the meeting a strawberry, vegetable and flower exhibit was held which added very much to the interest of the meeting. B. C. Warfield acted as general superintendent of exhibits, and had for his assistants Judge Charles Patterson and W. E. Stewart. The exhibit was made in the town hall, under the direction of superintendent of strawberries, S. H. Dolsen; superintendent of gooseberry department, J. H. Bellamy, and Miss Rena Dolsen of the flower department. The display was very fine, but not so great in quantity as that of two years previous. E. A. Riehl of Alton, Poscharsky and Son of Princeton, and E. M. Buechly of Greenville, Ohio, exhibited new varieties of strawberry plants in fruit which attracted much attention. The most elaborate display was made in the flower department by Arthur Webster, Centralia. The Society proper convened at Oddfellows' Hall and discussed questions of interest to fruit-growers.

The winter meeting of the Society will be held Jan. 23, 1895, at Patoka.

RICHLAND COUNTY

HORTICULTURAL SOCIETY.

OFFICERS FOR 1895.

PRESIDENT, ...	J. F. Jolly, Olney.
SECRETARY, ...	Charles F. Scott.
TREASURER, ...	Thomas M. Shields.

The Fifth Annual Meeting of the Richland County Horticultural Society was held in the court-house at Olney. About one hundred attended. The character of the meeting in all respects showed a marked advance over former meetings. The papers were extra good, and the discussions were productive of much information. Rev. C. Nash read two valuable papers on Forestry.

J. L. Zook gave his experience with the pear. He gave it as his opinion that Howell is the most promising pear for this locality. He could offer no remedy for pear blight, but expressed the opinion that there is money to be made on pears. He thought we were setting too many Ben Davis, and suggested planting with a view of a good succession of crops.

S. M. Thomson read a paper on quinces. He gave many facts which show that the quince needs a damp situation, and that if properly handled they could be made profitable. He has a quince orchard of 1,000 trees, now three years old.

T. W. Hutchinson on plums was an instructive article, and shows that we can rely only on such varieties as Wild Goose, Miner, Botan, Ogan and some other Japan varieties.

Charles Vanausdal said that the apple was fast finding a market beyond the Atlantic, and that in 1891 the exportation to European points exceeded 5,000,000 barrels.

Hon. E. S. Wilson spoke at some length in regard to "Handling and Disposition of our Apples." The enormous yield of apples soon to be a factor in this section suggests the employment of a large force of men: a force, which it will be difficult, if not impossible, to secure for the limited time required to gather the Ben Davis crop. He predicted that the time will come when the profit of the apple grower will be in that part of the crop which is now thrown away.

The interest in the proceedings did not seem to abate from beginning to the end of the meeting. It was the universal feeling that two more meetings should be held during the year—a summer meeting and an autumn meeting, the exact time to be fixed by the executive committee.

Kankakee Valley Horticultural Society

OFFICERS FOR 1895.

President,	William Cooper.
First Vice-President,	F. A. Baldwin.
Second Vice-President,	Mrs. L. Small.
Secretary,	John Devere.
Treasurer,	Mrs. M. J. Barnard.

EXECUTIVE COMMITTEE.

Leon Hay, G. H. Gray, O. L. Day, T. C. Dickinson, L. E. Cunningham.

MARCH MEETING.

The Kankakee Valley Horticultural Society met in the court room at Kankakee, Saturday afternoon, March 3, 1894. The attendance was only fair but the meeting was a success horticulturally as the discussions and essays were pertaining to Horticulture, and practical.

F. H. Stroud, essayist of the day, spoke about "Practical Horticulture and Practical Meetings." What we want is something useful and of value. By value we mean the profit made by our outlay of labor and capital. Some men with only a few acres raise more produce and make more money than others with many acres in cultivation. Horticulture is of some use; look at the vegetables, fruits and ornamentation grown by those who give some attention to it. Even though the meetings are beneficial to those who attend them, why neglect them? Horticulture needs study, systematic and thorough work, and persistency. Fruit growing is not a success often, because care and attention is not given to what is planted, and the country is not always to blame. Too many stop after having made a beginning.

O. W. BARNARD—Don't plant too many kinds. The average farmer has no time to experiment. We have twelve experiment stations in this State, besides the one at the State University, and they can do the experimental work for us. Don't plant anything that has no established value. Plant something on Arbor days, it will create a love for country.

J. N. CROSBY—When people write about Horticulture I would like to have them say something about their latitude, longitude, altitude, if near some large body of water, what kind of soil they have, etc. This would help determine whether we can do the same or not.

F. A. BALDWIN—How long would you cultivate apple trees?

J. N. CROSBY—I would cultivate them as long as I could. It seems to be necessary to stir the soil. When I first came here I planted apple trees and took care of them as they do in the east, but they failed. I planted others and did not trim them, and they do better, as the sun cannot scald them.

O. W. BARNARD—At the State horticultural meeting of Michigan, I heard the people say that they kept cultivating their apple trees most all the time. Some cultivated in the night, claiming the moisture was retained in the soil better then. The soil should be well pulverized, though not necessarily deep.

F. A. BALDWIN—What would you do for sun-scald?

J. N. CROSBY—Trim low and put a board on the southwest side. Ben Davis, Willow Twig, Jonathan and Duchess are good varieties.

F. H. STROUD—Mulching in the right way saves trees in a dry season. Stirring the soil and then putting a green mulch over it and covering with dirt has proven to be a good way.

F. A. BALDWIN—Top dressing, after thorough culture, is thought to be the best. I once saw mulching covered over with dirt and the plants did not grow at all.

MRS. N. W. GRINNELL—The method was wrong in that case, for the mulching was not placed right.

T. C DICKINSON—Inclining trees to the 2 o'clock sun didn't work with me, for the trees straightened themselves out. The board on the southwest side is good. Mulching currant bushes and grapevines, and with green mulch too, failed, for it drew the roots too near the surface, and the plants died afterwards.

J. N. CROSBY—Keep mulch off altogether and stir the soil.

O. W. BARNARD —To what depth would you cultivate small fruit?

J. N. CROSBY—Three inches is sufficient; cultivate often. Don't let the ground crust over, and don't let the weeds grow.

Miss Mina Devere then read a very good essay entitled, "The Kitchen Garden for the Family." The deplorable condition in which

we find most farmers' gardens was first depicted; then an ideal garden was graphically described, and made everyone wish they had one like it.

The subject for discussion, "Have Farmers' Sons an Equal Opportunity of Advancement in the Commercial, Professional and Literary World with the Sons of Other Occupations?" was discussed by Messrs. Stroud, Barnard, Cooper, Dickinson, Gray, Baldwin and Crosby. The farmer's son has as good an opportunity for advancement as the city boy; perhaps better, and he takes advantage of it, too, for we find, on investigation, that the great majority of our prominent men in this country were raised on the farm. Education does not hurt the farmer's son, but he is educated from the farm, not for it. Very few of the farmer's sons who have graduated from the agricultural college return to the farm. They will not return as long as they find opportunities to make more money in some other business. When farming becomes as remunerative as the professional or mercantile life, then the educated boys will remain on the farm.

SEPTEMBER MEETING.

The Kankakee Valley Horticultural Society held their fall meeting and basket picnic in Lenfestey's hall at Waldron, last Saturday. The weather was all that could be desired for that occasion, but the attendance was only fair. The ladies of the society deserve much credit for the sumptuous repast they served to the hungry horticulturists.

All present supplied themselves with delicious melons generously donated by B. F. Legg and M. Vandekarr. A young ladies' choir from Waldron sang several fine selections, to the enjoyment of all.

At 2:10 p. m., President Baldwin called the meeting to order.

Wm. Cooper reported that he had sounder and cleaner apples than he has had for several years. Some are dropping badly, but he thinks that this is due to the severe drouth of the past year. The Romanite is his best winter apple, and the Lowell his best fall apple.

F. A. Baldwin asked whether anyone had sprayed their apple trees, and with what success.

Wm. Cooper said that spraying is given credit for more than it deserves. This year those who sprayed some of their trees had an abundance of fruit, and claimed it was due to spraying. Others who had the same kind of trees, and did not spray them, had also an abundant crop.

O. W. Barnard said that spraying had proved successful in destroying insect pests and fungous growth in many instances, and has been tried with success for many years.

F. A. Baldwin found that in Ohio, where he had been a few weeks ago, fruit growers spray their apple trees, and the fruit is abundant this year, but of poor quality.

O. W. Barnard told of a gentleman at Westville, Ind., who had a fine orchard that had never borne any fruit. This year, upon a friend's suggestion, he sprayed the trees and put a colony of bees in the orchard. He has quantities of fruit where he never had any before.

Wm. Cooper said that grapes did not last long this year, on account of the wet weather at the time of maturity. The berries cracked and did not keep long. His crop was a good one in quality and quantity.

QUESTION—Does anyone know of a grape later than the Concord?

Captain George Cooper said that the Catawba is later; but sometimes it fails to ripen before frost. It ought to be planted in sunny places.

F. A. Baldwin continued: "While in Ohio, I talked with farmers and found that they planted their potatoes late in the season, and had better potatoes than when they planted early, for they grew after the dry spell was past."

Mr. Farr, of Waldron, exhibited samples of potatoes with their vines, which had been planted June 22. The tubers, though not well matured, were of large size, and the vines still very green and vigorous. Last year he planted potatoes June 14, and had a better crop than from those planted a month earlier. A. B. St. John, of Kankakee, exhibited some very fair samples of potatoes grown by himself.

O. W. Barnard then read a good essay about "Leaves."

John Devere read an essay entitled "Horticulture on the Farm." in which the present state of horticulture on most farms was well depicted, and the need of better horticulture shown.

The subject for discussion, "Watermelons" was then taken up.

F. A. Baldwin reported that the watermelons in the county exhibit at the State fair attracted much attention.

Mr. Vandekarr said that melons should be planted in the latter part of May, or the first part of June. Plant six or eight feet apart both ways; not too deep; cultivate often; fight the bugs with slaked lime, and keep the weeds out. A dry season is preferable for their growth, if the drouth does not begin too early. Clear sand is the best soil to raise them. The market is the biggest factor in the business.

B. F. Legg said, "I will tell you how to grow melons on clay soil, as I learned it from a man near Peotone. Dig a hole in the ground about the size of a half-bushel, and fill it with sand, then plant the melon seeds in that sand, and you will raise melons if you attend to them. One cubic yard of sand ought to be enough to fill holes where all the melons an ordinary family would use could be grown.

QUESTION—Would those melons be as sweet as those grown upon sandy soil?

ANSWER—There would not be much difference, only those grown on sand mature earlier.

On motion the society authorized those who will attend the State society's meeting at Dixon to invite, in behalf of our own society, the state society to meet in Kankakee next year.

Alton Horticultural Society

OFFICERS FOR 1894.

PRESIDENT, . .	John M. Pearson, Godfrey.
VICE-PRESIDENT, . .	Orville A. Snedeker, Jerseyville.
SECOND VICE-PRESIDENT,	Edward Simms.
SECRETARY, . .	Edwin H. Riehl, Alton.
TREASURER, . .	F. I. Crow.

JANUARY MEETING.

The annual meeting of the Alton Horticultural Society was held in Alton on Saturday, January 6, 1894.

The meeting was called to order at 1 o'clock by President Pearson.

ORCHARDS.

Mr. Pearson—For the protection of young trees against rabbits and mice I would recommend the use of blood, which can easily be obtained from any slaughter house. When well stirred it may be applied with a brush, and it has been the cheapest and surest remedy that I have ever tried.

Mr. Jackson—I would prefer the use of a wrap made of thin box stuff; it is more expensive, but I think it is safer than what has just been recommended, as I think the blood may wash off.

Mr. E. H. Riehl—We are now using a lime wash flavored with coal tar we find to be a good protector.

Mr. Pearson—Now is a good time to prune orchards and vineyards and we should all be taking advantage of these warm, sunny days that we are having now and get our trees and vines in good shape.

Mr. Jackson—Can any one give me any information about the bay worm and how to get rid of it? Much injury has been done to my trees, especially evergreens, by this insect of late years.

Mr. E. H. Riehl—I am quite well acquainted with the insect. It has killed two of our most valuable evergreens and is doing much damage to others. We have tried to kill them with Paris green but were not successful.

Mr. Jackson—Clarence M. Wead recommends a spraying of Paris green in early spring.

SMALL FRUITS.

Mr. Chas. Pierce—Strawberries were a paying crop with us the past year, Warfield being the most profitable. We also grow Downing and Captain Jack with good success.

Mr. Jackson illustrates the fact that strawberries are local in their habits by stating that his neighbor finds the Downing to be the most profitable berry he can grow, while with him it is very unsatisfactory.

Mr. Pearson—The time has come when it is necessary to grow large berries in order to make strawberry growing pay. Size is what we want, not quantity, and with proper cultivation any of our old standard varieties can be made to produce large berries. Mr. Hoffmeister is one of the most successful strawberry growers in the vicinity of Alton. His berries are always of the largest size and best quality. The secret is careful and thorough cultivation.

Mr. Jackson—Jessie did better for me last year than anything else, although it is known to be a very shy bearer. Annie Forest is my best berry for quality.

Mr. Riggs—Bubach is my best paying and most hardy berry.

MARCH MEETING.

A most interesting and instructive meeting was held March 8, 1894, at the residence of John M. Pearson, Godfrey.

Despite the very muddy roads quite a number of Madison and Jersey county horticulturists were present.

The following were appointed as committees on the different horticultural topics, and it is expected of them that they present a written report at each meeting during the year:

Mr. Davis, orchards; Mr. Gradolph, small fruits; Mr. Riggs, vegetables, and Miss Helen Riehl, ornamental planting.

Mr. Dickerson—Is it not true that seedling peaches are more hardy than others?

Mr. Browne—All varieties of peaches were once seedlings. A tree is not made less hardy by grafting or budding. Now is the time to prune peach trees, since we know that we are to have no fruit from them this year.

Mr. E. H. Riehl—I have examined the buds of many varieties of peaches and have not found one live bud. We are giving our peach trees a severe pruning, by which process we shall get a well distributed growth of young wood for a crop next year. I noticed while pruning that the wood of the peach tree is considerably damaged. The La Conte pear is killed; Howell and Mt. Vernon are damaged. A great many varieties of plums are killed; cherries of all kinds are perfectly sound.

The question was asked: "When, how and why shall we prune peach trees?"

Mr. Davis—I prune in the early spring, cutting back the limbs from two to five feet in length. If trees are not pruned the fruit will all be on the ends of the limbs and many of them will break down. I believe in pruning low, but do not have any limbs nearer than three feet to the ground.

Mr. Jackson—When is the proper time to begin spraying orchards?

Mr. Browne—That depends on what you are spraying for. If for scab the first spraying should be done before the leaves appear, and if for codling moth soon after they appear. When necessary it is well to use a compound solution that will destroy both scab and codling moth at the same time.

SMALL FRUITS.

Mr. Crowe—I find that it is not best to dig out blackberries that are affected by rust, for in so doing you cannot get all of the roots out, and those remaining will grow and thus spread the disease more rapidly than if they are left alone entirely. I find that it is much better to simply cut them off at the ground.

Mr. Jackson—If you want a good blackberry that does not rust plant Taylor's Prolific.

Mr. Riggs—The Erie seems to be a promising variety so far as I have tested it.

Mr. Browne—The Erie is somewhat similar to the Lawton and not better.

Mr. Jackson—How about Wilson, Jr.?

Mr. Browne—It is very much subject to diseases and not hardy.

VINEYARDS.

Mr. Browne—Now is the time to prune vines and get them in shape for spraying. If vines have never been sprayed before it would be well to spray the first time before growth starts, otherwise just after the buds begin to push. They should be sprayed again just before blooming and again just after blooming. In an ordinary season four sprayings are sufficient.

Mr. Pearson—How do you prune and trim Moore's Early grape?

Mr. Brown—I use the trellis system. Stretch two No. 9 wires on posts twenty-four feet apart. To keep wire from slacking I take a stone of considerable weight, fasten a wire around it, bury it in the ground on opposite side of post from wire, some two or three feet deep, and fasten other end to top of post. I like this method much better than the old bracing system. I prune long and when vines begin to grow thin, leaving about thirty eyes to the vine to be fruited.

Mr. Pearson advises all who expect to plant vineyards to send to the State University at Champaign, Ill., for a report of the Illinois experiment stations, which gives some very valuable information about varieties of grapes. That pamphlet is free to all who may wish to send for it.

GARDEN.

Mr. Riggs—As soon as the soil can be worked early vegetables should be planted.

Mr. Pearson—Salsify ought to be planted very early.

Mr. Sims—I have my hotbeds made and seeds sown. As soon as the soil is in condition will plant early vegetables, such as potatoes, salsify, peas, beets, onions, radish, lettuce and parsnips.

Mr. Browne exhibited some most excellent specimens of the Rural New Yorker No. 2 potato, which he says is the best and most profitable variety that he has ever grown.

Mr. Jackson—I find that Alexander's Prolific is better in quality than any other variety I have tried and I have always realized a better price for it than for any other kind.

Mr. Browne—The Rural New Yorker is just as good as Alexander and will sell just as well where it is known. I do not believe in the one eye system of planting potatoes. I have found that it is necessary to plant a large piece of potato in order to get best results. The Freeman that is so extensively advertised I would discard. It is not early and yields too many small potatoes. New Market is a better potato than Early Ohio, but seed is hard to get. It is larger, smoother and of better quality.

Mr. Hollister showed a sample of Dr. Woodhull corn which he recommends for trial, it being quite large, very early and an excellent yielder. He also had a nice sample of watercress on the exhibition table. On this table were also to be seen some fine samples of salsify, parsnip and celery from Mr. Sims, and a most beautiful bouquet of double petunias from Miss Davis.

Mr. Pearson stated that it would pay every man who had stock to feed to purchase a machine for cutting fodder. He says fodder will go twice as far when cut as before, and be much better for stock. He feels sure that a machine will pay for itself in a very short time.

ORNAMENTAL PLANTING.

Mr. Pearson—I think that trees and green grass add more to the beauty of a place than anything else and it is something that is very easy to get. Some of our native climbing plants are quite ornamental, such as American ivy, trumpet vine and bitter sweet. Wisteria and honeysuckle are also very pretty.

A motion was made that $30 be set aside for premiums for June meeting. It was adopted and a committee of three was appointed to award premiums on strawberries, cherries, flowers and vegetables for said meeting.

May meetings of the society were held at the residence of Mr. G. H. Carey, near Millville, May 5. Reports upon condition of fruit trees and plants and revision of premium list was the principal business of the meeting.

On May 26 the the society met at the residence of Mr. Frank Hoffmeister, near Alton, who lives in an elegant mansion surrounded by many beautiful shade trees, ornamental shrubs and plants. The meeting was held under a tulip tree sixty years old and nearly three feet in diameter. Another rare and valuable tree worthy of special mention is an aged hemlock which adds much to the beauty of the place.

The president called on those who were experimenting with new varieties and the secretary reported as follows:

We are fruiting six new strawberries this year. Of these "Williams" is, perhaps, the best. It is quite productive and good size, good quality and firm. Eclipse is inclined to be early; resembles Haverland in shape, size, quality and productiveness. Parker Earl, medium size; overbears; not profitable with us. Dew, not productive; berries very large, quite firm and of good quality. Lanah, not very productive; medium size, good quality, excellent shipper. Greenville, large, productive, good quality, soft. Our Seedling No. 6 is giving us better results than anything else we have on the place and looks more promising than ever.

VINEYARDS.

Mr. Pearson stated that his vines were much damaged last winter.

Mr. Cooke wished to know how to go about laying the vines down for winter protection.

E. H. Riehl—Prune the vines and put enough earth on them to hold them to the ground.

VEGETABLES.

Mr. Crowe stated that everything in the vegetable line was backward this season, judging from the way they had been coming to market.

Mr. Sims is of the opinion that the season is not backward, that the reason vegetables have been slow going to market is owing to the fact that they were damaged by the frost in March. He reports much damage to beans, melons, sweet potatoes and other tender plants by the frost which occurred on May 17, and nothing has made any growth since that time. Thinks there will be an overproduction of peas when they do come in.

Mr. Riehl reports much damage to sweet potatoes by late frost. Recommends cutting sweet potato plants when taken from beds in preference to pulling them. When plants are pulled the eye is often pulled out of the potato, and a new eye must be formed. By cutting the plants off close to the potato the plants come much quicker and are better.

Mr. Pearson wished to know how late muskmelons could be planted, in reply to which the secretary stated that he expected to make a plantation the first week in June.

Mr. Cook wished to know what varieties were best to plant.

Mr. Riehl recommended Banquet, Surprise and Columbus.

Mr. Crowe speaks well of Honey Dew.

Mr. Jackson stated that small melons are best for shipping. His favorite varieties are Ward's Nectar and Netted Gem.

Mr. Hurd likes the Banana, but he is the only one who speaks well of it.

Mr. Pearson recommends Ward's Nectar very highly.

There was held in connection with this meeting a large and fine exhibit of strawberries and flowers; the exhibit of vegetables being quite small owing to the late frost. Premiums were awarded and at the close the fruit was sold.

AUGUST MEETING.

The Society held a meeting in the Clifton Terrace Hall, on Saturday, August 11, 1894. President Pearson in the chair.

Mr. Stiritz settled here in the year 1850 and since that date has been more or less engaged in the cultivation of grapes and other small fruits. Grapes are with him a specialty. His vineyard is located on a large hillside sloping to the river, which would be too steep for cultivation had he not built terraces. These terraces are all walled with stone and add much to the beauty as well as the value of the place. Mr. Stiritz makes wine of most of his grapes. Hundreds of shade trees have been planted and an arbor some three hundred feet long and twelve feet wide has been constructed. To this arbor Mr. S. is training grapevines, mostly Missouri Riesling, which in a year or two will completely cover it and yield immense quantities of grapes.

ORCHARDS.

The general report was that there will not be orchard fruit enough this year for home consumption.

Mr. Snedeker has a twenty acre orchard of Smith's Cider, Rome Beauty and Ben Davis that will yield perhaps fifty barrels of apples.

Mr. T. R. Hintz, of Clifton Terrace, wished to know how we can make orchard fruit pay here in competition with California and Arizona, where they can be grown much easier, growers not having to contend with insects and the many diseases that we have to fight here, and where irrigation can be done from $1.25 to $6.90 per acre? The general reply to this question was that, the fruit there grown being much inferior in quality to ours, it would never be able to crowd us out, though it is believed that it will hurt some of our markets to a certain extent. It was the general opinion that there will always be a market ready to receive, at a fair price, all the orchard fruits, especially pears, that Illinois can produce.

The president questioned the different members in regard to the condition of trees set out last fall and this spring:

Mr. Hillard stated that the fall-planted trees have made good growth and stood the dry season pretty well, but that those planted this spring have suffered considerably.

Mr. Pearson stated that it is only the first year after planting that trees suffer much from drouth, unless when planted on hillsides.

The question was asked, "Which is the better time to plant trees, in the fall, or spring?" to which Mr. Pearson replied that the fall is now considered much the better.

Committees appointed to examine exhibition table read the following reports:

Your committee find on the table five varieties of apples from E. H. Riehl: Keswick Codlin, Maiden's Blush, Bailey's Sweet, Jeffries Strawberry. Grapes—17 varieties: Vergennes, Sewell, Prairie State, Iona, Niagara, Wilson, Woodruff, Jewell, Seedly, Siglar, Empire State, Massala, Worden, Ives, Moore's Diamond, Champion, Goethe, Arbor. From Louis Stiritz: Concord grapes. From Mr. Pearson—Apples: Keswick Codlin. Pears—Seckel, Clapp's Favorite and Bartlett.

E. HOLLARD.
E. HOLLISTER.

Your committee on vegetables find quite an interesting display. Stikes' ex-Early watermelon; Surprise and Banquet muskmelon, all of which are very tempting to the committee. Mr. Copley exhibits Stowell's sweet corn, which we think is worthy of notice. Also exhibits beets, Optimus tomatoes, and potatoes without name, all of them good, considering the dry season. Capt. Hollister exhibits Dr. Woodhull corn, which is of large size and deep grain; Liberty Bell tomato, which are somewhat uneven in shape. Mrs. Challacombe exhibited some cucumbers, which were very nice.

R. T. Smith,
E. C. James,
W. Hyndman. } *Committee.*

Of flowers there was quite a handsome display which added much to the beauty and interest of the general exhibit.

A motion was made that a sum not to exceed $30 be appropriated for premiums to be competed for at the September meeting.

SEPTEMBER MEETING.

The Society met at the residence of E. A. Riehl on September 1st, 1894. President Pearson in the chair.

ORCHARDS.

The President wished to know if the late rains were not too late to be of much benefit to young trees.

Mr. Jackson thinks the rain was a good thing for orchards, especially where they were plowed.

Mr. Riehl thinks that everything was greatly benefited.

Mr. Hurd has a four year old peach and apple orchard which the late rains had helped very much.

Mr. M'Pike reports that there has not been enough rain at his place to be of much benefit. Lost some Magnolia and other valuable trees on account of the drouth.

VINEYARDS.

Mr. Jackson reports fine success with the Delaware grape. His success is due to rich soil, careful attention and thorough cultivation. He finds the weakest point of this choice variety to be its foliage.

Mr. M'Pike is successful with Catawba, another very choice variety which is hard to grow on account of its weak leaf. He also grows the Delaware but finds it unprofitable. Mr. M'Pike is one of the most successful grape growers in the vicinity of Alton and his success is due to spraying at the proper time, careful pruning, thorough cultivation and the use of stable manure.

Mr. M'Pike thinks that every person that grows grapes ought to be able to graft, so that they could make over any old worthless vine to one of our modern much improved varieties. He does his grafting in early spring before the leaves appear.

Mr. Riehl stated that grafting could be done successfully after the leaves appear. Owing to the dry season there was very little rot this year, even where vineyards were neglected.

Mr. Pearson got the impression from previous statements that several years of thorough spraying would permanently extinguish the rot.

Mr. Riehl stated that this was a big mistake and gave the following example: When a new vineyard is planted on land where grapes have never grown, there will be no rot the first year of fruitage and very little the second, but the spores will be carried there from some of our native wild vines, which are all more or less subject to rot, and in ordinary seasons, with no spraying, will grow and spread and in a few years take the entire crop.

Mr. M'Pike stated that while the past season was favorable for grapes in regard to the rot, it also had some bad effects, viz: uneveness in ripening and inferior quality.

SMALL FRUITS.

Mr. Hoffmeister has realized much damage by the crown borer to his young strawberry patches and wished to know if any one could tell him how to get rid of it.

Mr. Jackson thinks the best plan is not to plant a new patch where an old one has previously been plowed under, and when plants are suspected dip them in some solution, before planting, that would destroy the insect.

The Chair appointed Mr. Jackson a committee of one to hunt up the life history of the crown-borer and report at the next meeting.

Mr. Riehl expressed a desire to have all the members interested in strawberry culture visit his three-acre plantation of No. 6, and invited the society to hold its next June meeting at his residence and see it fruiting.

Mr. Riehl exhibited specimens of the new mushroom, *Agaricus subrufescens*, and stated that this new mushroom was recommended by eastern growers because of the ease with which it can be produced all through the summer. The method of growing is to procure fresh horse dung, free from straw, thoroughly mix it with one-third as much good garden soil, put into a pit about twelve inches deep, packing it solid; this will heat, rising to 100° Fahrenheit, and more; when the heat goes down to 85° plant small flakes of spawn the size of a hickory nut about an inch under the surface, and about twelve inches apart. About a week after planting the spawn, cover with one or two inches of good garden soil, and keep well watered. Cover with glass or board to retard evaporation.

A very fine exhibit of pears, apples, grapes, flowers, vegetables, etc., was made by members of the society and premiums to the amount of $30 were awarded.

OCTOBER MEETING.

The Society met, October 6th, in the hall of Prairie Union Grange, five miles east of Jerseyville; Vice-President Snedeker in the chair.

There was a large attendance, especially of members of the Grange, who came to partake of the horticultural knowledge and experience, to be had for the asking, of the old and experienced fruit growers composing the society.

Prairie Union Grange was organized in 1873 and is one of the most prosperous granges of the State, and is of great benefit to the members and the neighborhood financially and socially. In 1892 they built their present convenient and comfortable hall, 22x44 feet, two stories high. It is neatly and tastefully furnished, the whole having cost about $1,600 with the acre lot on which it stands. It would be a great benefit to the State if every neighborhood had such a society and hall.

ORCHARDS.

The apple crop was stated to range all the way from an almost total failure to a third of a crop; Janet trees bearing a better crop the country over than any other variety, though some few orchards reported a moderate crop of Ben Davis. While the Janet this year gives a better crop than any other variety, it must be borne in mind that it is an exception, caused by the fact that the Janet blooms later than nearly all other varieties.

VINEYARDS.

President Snedeker said that a friend wished to plant 1,000 grape vines; 500 for the market and 500 for family use, and had been given the following list: 500 Wilder for the market; 200 each Worden, Niagara, and 100 Goethe, and asked the members what they thought of the list.

Mr. Jackson thought 500 was an unusually large number of vines to plant for family use.

Mr. Riehl thought the list not a good one. While for himself the Wilder was one of the best, he would not recommend it to the average planter. The Worden he would not plant for market at all because it cracked so easily. The Niagara was all right, being here the best all round white grape we have, both for market and family use. The Goethe he would not plant at all for market, being too late, ripening when the markets are full of cheap northern grown Concords. It is one of the finest late grapes we have and should be planted more generally for home use. Our aims should be to grow early grapes to supply the markets before northern grapes appear, the early grapes grown here being from 30 to 50 cents per basket, while the late that come in competition with the New York crops being but 15 to 20 cents. A better list would be 500 Moore's Early, 300 Niagara, 200 Wilder.

Mr. Vandenberg---Is not the Moore's Early a shy bearer?

Mr. Riehl—It is, especially when improperly pruned. It does not fruit on large canes, therefore care should be used to fruit it on light canes, or if these can not be had then leave the laterals of the stronger canes.

Mr. M'Pike did not think the list a good one. The Wilder,

while one of the best black grapes, needed special care in growing; Worden cracked badly, but was of better quality than Concord, larger and about a week earlier. Niagara was the best of the white grapes; Goethe did not hold its foliage well, and, therefore does not always ripen; Norton's Virginia was a good eating grape, but small and therefore not often seen in the market, but used for wine; had procured wood of several varieties of grapes from California and grafted them, but they are a failure.

Mr. Jackson said he had good success with the Telegraph and Delaware.

Mr. Riehl recommended the planting of grapevines about buildings, to be trained on the walls of same, as in such situation fine crops of all kinds of grapes can be produced without fail, free from rot or mildew. It makes no difference what the aspect is, except that it is best to plant tender varieties on the north side.

SMALL FRUITS.

Mr. Jackson reported all small fruits in excellent condition for next season; and this fall, planted strawberries with good success. In answer to a question, said he considered the Tyler and Nemaha the best black, and Brandywine and Turner the best red raspberries; the Snyder and Erie the best blackberries.

Mr. Vandenburg said with him the Nemaha and Ohio were the best black and Turner the best red raspberry for family use or near market, being too soft for distant shipment. In blackberries, knew nothing superior to Snyder.

Mr. Jackson recommended the mulching of raspberry and blackberry plantations, as saving work, retaining moisture, and thus making a better crop in dry weather, and facilitating the rooting of the tips in blackcaps.

Mr. Jackson read his report on the strawberry crown borer, with letters from Prof. Forbes and Messrs. Endicott and Goodrich, and the same was discussed. On motion the report was laid over for farther discussion at the next meeting, and Mr. Jackson requested to condense said letters, as much as possible, and embody them in his report.

The committee on fruits presented the following report:

Your committee find on the table from Mr. Bell fine samples of Vandeveer Pippin, Ben Davis and Jenneting. From Mr. Simons, Grimes Golden. From Mr. Vandenburg, Jenneting, Winesap and Large Romanite. From Mr. M'Pike, Winter Nellis pears, grapes—Niagara, Muscatel, Empire State, Old Mission, Goethe, Lady Washington, Agawam, Norton's Virginia.

The committee on vegetables made report as follows:

Mr. President:

We find on the table some very fine specimens of sweet potatoes from Mr. Riehl, namely, Burzelle of the best quality. Extra large Early Carolina, Southern Queen, Bermuda, Strasburg, Red Jersey and Vineless or Bunch Yam. From Mr. Sims some very fine egg plant, peppers, celery and radishes.

CRAWFORD COUNTY

FRUIT GROWERS' ASSOCIATION,

ROBINSON, ILLINOIS.

The officers of the association are:—

President, ...	S. L. Bennett.
Vice-President, ...	J. D. Trimble.
Treasurer, ...	E. E. Newlin.
Secretary, ...	G. N. Parker.

REPORT BY THE SECRETARY.

Our Association meets quarterly and we have some very interesting discussions on horticultural subjects. Our people are alive to fruit growing. We have within a radius of five miles of this city over 800 acres of commercial orchards.

The present outlook for a full crop next year is excellent.

We have forty members and hope to have many additions.

Springfield Horticultural Society.

OFFICERS.

PRESIDENT, ...	W. H. Lightfoot, Springfield.
SECRETARY AND TREASURER, .	J. W. Cogdall, Springfield.

THE APPLE ORCHARD.

JOHN UPTON, SPRINGFIELD.

(Read before the Springfield Horticultural Society, May, 1894.)

Mr. President:

To-day Sangamon county can count on as good a yield of merchantable apples per acre for her orchards as can any like area within what has hitherto been denominated the great apple belt of Illinois.

The march of years and change of seasons will no doubt be such in the near future that he who plants and cares for his orchard will realize the full measure of his expectations. I wish to emphasize the word *care;* an orchard planted is by no means an orchard matured. More than one-half the trees planted never produce an apple and less than one-tenth ever pay the price of purchase and expense of growing.

The probability that others may fail only strengthens our desires to succeed. In this case, as in many others, the exception and not the rule prevails. Less than five per cent of all who embark in a mercantile life succeed, yet that is sufficient to keep the field well filled. Can not we do as well? Certainly we can do but little worse.

As to the manner and method of planting and cultivating I cannot hope to add anything new. It is the same story over and over. There is nothing strange about this. We mostly follow where others lead. We say the same prayers our fathers said and sing the same songs our mothers sang because our wants and needs are the same as theirs. Perhaps I can in no other way benefit this society more than by giving my personal experience in the rearing of an orchard. I hope some one here may profit by my mistakes.

Twenty years ago I planted my first orchard near this city and a great mistake I made of it. I planted fine varieties, such as grow in

Eastern States and such as seemed particularly suited to my taste. The result was a natural one—it was a failure.

As soon as I realized the fact of failure I began top grafting and digging out until my orchard now has trees all the way from one to twenty years of age.

I plant trees thirty-three feet apart each way and always set in the spring. I have never lost more than three or four per cent until the last two years. I cultivate the ground well in some summer crop, either corn or potatoes. In the spring of the year I plow so as to leave each row standing in the dead or finishing furrow, and in the fall after the crops are removed I reverse my manner of plowing and leave the trees standing in the center of the land with a slight ridge of ground thrown to each row. I aim to cultivate at right angles, so that at the end of the fifth or sixth year when I seed to clover the ground is as level as a well kept lawn.

I consider it of great importance that the trees are not ridged up by cultivation, as some varieties grow shallow while others grow deeper, each variety assuming a different depth.

After my trees have reached the bearing age I cut out dead wood and water sprouts, but do little more than this in the line of pruning.

I believe a rich reward yet awaits the man who has the courage to plant and properly care for an apple orchard here in central Illinois.

LIST OF OFFICERS

—OF THE—

Pike County Horticultural Society,

FOR 1894.

PRESIDENT, ...	Richard Perry, Griggsville.
FIRST VICE-PRESIDENT, .	W. E. Cadwell.
SECOND VICE-PRESIDENT, . .	R. J. Walker, Griggsville.
SECRETARY, ...	Chas. G. Winn, Griggsville.
TREASURER, ...	J. B. Morrison.

INDEX.

Act to Reorganize the Illinois State Horticultural Society vi
Address of Welcome, State 7
Northern 261, 308
Central 357
Southern 205
Annual Meeting, 1895 iv
Apple Scab 105
Ad interim Committee iv
Augustine, H., Paper by 361, 374, 434
Auschick, Conrad, Paper by 268
About Young Apple Trees 397
Apples (see Orchards).
Awards on Fruit and Vegetables 132
Apples by the Carload 328
Alton Horticultural Society 460
Baldwin, Elmer, Paper by 182, 294
Obituary Resolutions on 181, 352
Barnard, O. W., Address by 262
Paper by 183, 314
Barnett, G. W., Paper by 344
Barg, Mrs. W., Paper by 231
Beal, L. N., Paper by 239
Burrill, Professor T. J., Remarks by 116
Paper by 122, 438
Bryant, Arthur, Report by 2
Bryant, L. R., Remarks by 118
Report by 165
Bryant, Lester P., Paper by 275
Buffett, J., Paper by 335
Bisulphide of Carbon as an Insecticide 237
Bordeaux Mixture, How Prepared, etc 109, 237
Barnyard Manure as a Fertilizer for Orchards 141
Bitter Rot 105
Beautify the Home 271
Blackberries, Paper on 73, 331, 341, 380
Covering for Winter Protection 342
New Varieties 139

Constitution and By-Laws State Society..... v
Central..... 354
Cherries..... 158
Central Society, Lincoln Meeting, 1894..... 353
Champaign Meeting, 1895..... 401
Officers for 1894..... 355
" " 1895.....
Members for 1894..... 350
" " 1895.....
Constitution and By-Laws..... 354
Crawford County Horticultural Society..... 474
Concerning Parasitic Fungi..... 384
Cauliflower..... 414
Celery, Best Methods of Keeping and Bleaching..... 118
Codling Moth..... 324
Currants, Papers on.....67, 228, 332, 340, 385
New Varieties..... 138
Commission Merchant an Ally of the Fruit Grower..... 344
Curculio..... 323
Committees Appointed.....11, 12, 13. 56, 265, 307
Committee Reports.....85, 121, 132, 148, 181, 293, 339
Corbin, Eli, Paper by..... 185
Coe, Ira J., Elected Honorary Member Northern Society..... 346
Cook, G. W. E., Report by.....358, 404
Cotta, H. R., Paper by.....73, 340
Appointed Delegate..... 352
Cotta, J. V., Address by..... 310
Clinton, G. P., Paper by..... 325, 384, 445
Dennis, C. N., Paper by..... 432
Doan, H. L., Paper by.....87, 365
Dunlap, H. J., Paper by..... 183
Dunlap, Henry M., Report by..... 3
Prize Essay by..... 18
Paper by.....394, 413
Dyer, W. S., Paper by..... 378
De Young, H., Paper by..... 414
Delegates Introduced..... 59
Delegate to Iowa, Report..... 198
Delegate to Wisconsin, Report..... 57
Delegate to Missouri, Report..... 168
Diversity of Fruit Products..... 211
Disposition of Fruits..... 218
Dewberry, The Lucretia..... 253
Dishonest Packing and Marketing of Fruits..... 280

Discussions; Horticulture at our Fairs 15
Planting and Growing Apple Orchards 23, 97, 318
Vegetable Gardens 28
Irrigation 30, 368
Are Winter Onions Profitable? 38
European Varieties of Apples 33
How to Prevent Borers from Destroying Trees 40
On the Extent of Orchard Planting 41
Strawberries, Varieties, Cultivation, etc 62
Currants and Gooseberries 71
Raspberries and Blackberries 76
On Raspberries 267, 379
Blackberries and Strawberries for the Farmer 383
The Lucretia Dewberry 253
Small Fruits 227, 333, 338, 412
New Varieties of Small Fruits 249
Prospects for Small Fruits in 1895 86
Fruit List for the Southern District 81
Fertilizers in Fruit Growing 90, 252
The Farmer's Orchard 371, 413
Market for Orchard Products 118
Late Plowing of Orchards 248
Relation of Bark Lice to Horticulture 178
Kerosene Emulsion for Bark Lice 180
Insecticides and Spraying 239
Fungicides 113
Russian Thistle 116
Grape Culture 152, 157, 207
Diversity of Food Product 212
Disposition of Fruit 220
Frozen Roots of Nursery Stock 243
Botan and Abundance Plums 245
Pollenization of Fruit Blossoms 246, 275
Pruning Standard Pear Trees 250
Distance Apart to Set Pear Trees 251
Varieties of Pears for Market 251
Best Late Pear 254
Propagation of Plants 362
Experiment Station Report 141
Cauliflower 415
Abundance Plum 318
Thoroughness in Horticulture 314
Plant Improvement 130
Time of Holding Annual Meeting 146

Experiments in Crossing the Grape 429
Experiment Stations, List of 196
Earl, E. C., Paper by 184
Experiment Stations, Report 136
Expenses of State Society for 1894 6
Enemies of Orchard Culture 323
Election of Officers, State Meeting 135
Central 432
Northern Society 339
Executive Board Meetings 188
Executive Board Members iv
Edwards, Samuel, Paper by 271
Elliot, Gen. S. H., Address by 261
Early Richmond on Mazzard Stock 318
Flowers, Paper on 231
Fighting the Drouth 47
Final Resolutions 181, 255, 302, 352
Fungous Diseases of Plants 319
Fertilizers, Use of in Fruit Growing 87, 252
Formula for Combination Mixture xiv
Fungicides, Papers and Remarks on 101, 109, 112, 113, 233
Directions for Use xv
Formula for xiv
Fruit in Northern Illinois 271
Fruit on the Farm 394
French, Professor G. H., Paper by 221, 233
Fry, R. T., Address by 206
Foster, Geo. J., Paper by 67
Freeman, Mrs. Ellen Bryant, Paper by 288
Gould, W. E., Paper by 46, 207
Guilford, Mr., Remarks by 64
Goodrich, T. E., Paper by 162, 168, 217
Address by 146
Geeting, C. U., Paper by 343
Goff, A. M., Paper by 408
Gaston, A. H., Paper by 274
Grapes 138, 149, 207, 332
Grape Rot 107
Gooseberries, Varieties and Cultivation 67, 138, 332, 340, 385
Gooseberries, Mildew of 107
Horticulture at our County and State Fairs 13
Hartwell, J. L., Paper by 57, 184, 416
Hill, Mayor, Address by 357
Hart, C. W., Paper by 348

Hatch, Fred, Paper by..... 325
Hatch, A. L., Paper by..... 149
Hollenbee, A. O., Paper by..... 450
Influence of Horticulture on Civilization..... 294
Influence of Flowers..... 348
Irrigation in Illinois..... 363
Irrigation..... 365
Insecticides..... 233
Johnson, W. G., Paper by..... 170
Johnson, Jas. T., Address by..... 407
Kankakee Valley Horticultural Society..... 456
Kerosene as a Remedy for the Bark Beetle..... 247
Kerosene, New Method in Using..... 237
Kerosene Emulsion for Bark-Lice..... 180
How to Make It..... 235
Knapp, Geo. F., Paper by..... 185
Kellogg, R. M., Address by..... 47
List of Fruits Recommended for Northern Illinois..... xii
" " " " Central Illinois..... xii
" " " " Southern Illinois..... xiii
" Trees, Shrubs and Climbers Recommended..... xiii
" Awards on Fruits..... 132
Location of Annual Meeting at Kankakee..... 135
Lincoln Pear, A Statement..... 196
Moore, A. F., Paper by..... 328
Remarks by..... 155
Minkler, S. G., Remarks by.....153, 267
Paper by..... 182
Mendenhall, E. G., Report by..... 207
Paper by..... 228
McCluer, G. W., Prize Essay by..... 93
Report by.....136, 359, 404
Paper by.....104, 397
Marion County Horticultural Society..... 454
Marketing Garden Products..... 268
Members of State Society..... viii
Of Northern.....259, 305
Central.....356, 402
Southern..... 203
Northern Society, Report of Princeton Meeting..... 257
Report of Marengo Meeting..... 303
Officers for 1894..... 258
Officers for 1895..... 304
Members for 1894..... 259
" " 1895..... 305

Officers of State Society..... iv
Central.....355, 402
Southern..... 202
Northern.....258, 304
Pike County..... 477
Warsaw..... 452
Alton..... 460
Effingham County.....
Marion County..... 454
Clay County.....
Richland County..... 455
Kankakee County..... 456
Crawford County..... 474
Springfield..... 475
Orr, A. W., Paper by..... 187
Observations at the World's Fair..... 275
Our Native Flora..... 293
Orcharding, Past, Present and Future..... 435
Orchards, The Best Method of Planting and Growing (Prize Essay).....18, 93
Selecting a Site..... 18
Proper Distance Apart to Set Trees..... 19
How to Set Trees..... 19
Pruning Trees..... 20
Low headed Trees the Best..... 21
Selecting Varieties..... 21
Cultivation.....22, 325
Use of Fertilizers..... 23
Puddling Tree Roots.....24, 26, 27
Protecting Trees.....27, 98
How to Destroy the Borer..... 40
Fall Setting of Trees..... 100
Late Plowing of..... 248
The Farmer's Orchard.....369, 413
Report on..... 221
Notes on the Apple Orchard..... 347
Is Orchard Planting Keeping Pace with Destruction of..... 41
What European Varieties do well Here..... 33
Will Europe Prove a Profitable Market for Apples..... 46
Will there be a Profitable Market for Apple Products..... 118
New Apples..... 136
Pearson, John M., Response by..... 8
Report by..... 79
Palmer, J. F., Address by..... 7
Perrine, W. S., Paper by..... 211

Powell, C. R., Paper by 266
Piper, D. J., Paper by 271
Picking and Marketing Fruit 343
Proceedings of State Society 1
Southern 201
Northern 261, 307
Central 357, 403
Alton 460
Warsaw 452
Kankakee 456
Practical Botany in Experiment Stations 445
Plums 137, 160, 318
Prize Essays 17, 18, 93
Report on 148
Extracts from Competing Essays 182
Potato Scab 108
Parasitic Fungi, Paper on 325
Possibilities for Plant Improvement 122
Pollenization of Fruits 274
Peaches, Paper on 162
Best Five Varieties for Market 254
Pears 162
Distance Apart to Plant 251
Best Late Variety 254
Pruning Standard Trees 250
New Varieties 137
President's Address, Southern 206
Central 407
Northern 262, 310
Progress of Fruit Growing 229
Pyrethrum as an Insect Destroyer 234
Pruning Grapevines 450
Question Box 11, 318
Rugg, G. H., Letter from 39
Riehl, E. A., Paper by 149, 229
Response by 206
Rautenberg, E. F. L., Paper by 429
Rowley, H. E., Paper by 391
Robinett, D. A., Remarks by 135
Russian Thistle 119
Report of Delegate to Michigan 197
" " Iowa 198
" " Missouri 168
Report of First Vice-President 213
Ricker, Prof. N. Clifford, Paper by 421

Relation of Bark-Lice to Horticulture.... 170
Report to Governor.... iii
Resolution in favor of Standard Fruit Packages.... 285
Resolution Indorsing Object of Commission Merchants' League....156, 346
Richland County Horticultural Society.... 455
Retrospect and Prospect in Fruit Growing.... 217
Raspberries, Papers on....73, 330, 333, 340, 378
The Columbian.... 334
Report on Varieties....139, 266
Special Training for Farmers in Public Schools 415
Sudduth Pear, A Statement 145
Picture of, Frontispiece, and page.... 200
Small, Len, Paper by.... 13
Strubler, Phil, Paper by.... 285
Sumner, Chas. H., Paper by.... 186
Sanders, Edgar A., Paper by.... 293
Shurtleff, Mayor E. D., Address by.... 308
Shamel, C. A., Paper by.... 280
Shimer, Dr. Henry, Paper by.... 347
Cultivation, Marketing, Varieties, etc.... 380
Strawberries....59, 107, 329, 333, 336
Renewing Old Plantations.... 337
New Varieties.... 140
Small Fruits, Cultivation, Varieties, etc....222, 249, 285, 329, 334, 335
Pruning and Winter Protection.... 340
Picking and Marketing.... 343
Lack of Among Farmers.... 239
Propagation of Fruit Plants for the Farmer.... 361
For the Farm.... 408
Secretary's Report, State Society.... 3
Northern.... 260
Central....359, 404
Southern.... 207
Springfield Horticultural Society.... 475
San Jos[illegible] Scale.... 238
Spraying for Fruit.... 101
Spraying Pumps.... 111
Spraying in 1894.... 248
Paper on....101, 233
New Compound.... 235
Combining Mixtures.... 236
For the Bark Beetle with Kerosene.... 247
Some Results in Experimental Work.... 221
Southern Society, Report of.... 201

Southern Society, Officers of..... 202
Members of..... 203
The Fruit Grower's Dream..... 46
The Horticulturist as a Business Man..... 432
The Farmer's Orchard..... 369
The Farmer's Home..... 421
The Tree Agent..... 374
The Sand Plum..... 391
The Hundredth Man in Horticulture..... 325
Treasurer's Report, State Society..... 2
Southern..... 207
Northern..... 262, 309
Central..... 358, 403
Thoroughness in Horticulture..... 314
Taylor, A. F., Address by..... 205
The Farmer's Orchard..... 413
The Future of Orcharding..... 434
Vegetable Garden, The..... 28
Are Winter Onions Profitable?..... 38
Warsaw Horticultural Society..... 452
Winn. C. G., Paper by..... 369, 435
Williams. F. L., Paper by..... 187
Washburn. Andrew, Paper by..... 28
Warfield. B. C., Paper by..... 59
Walker. W. J., Paper by..... 101
Wise. J. M., Paper by..... 334
Weston. Nathan, Paper by..... 187
Webster. Jabez, Report by..... 213
Wilson. E. S., Paper by..... 218
Woodard. L., Report by..... 262, 309
Wallace. J. F., Paper by..... 363
Women as Gardeners..... 288
What is being done at our Experiment Stations..... 241
Water and Vegetation..... 438

UNIVERSITY OF ILLINOIS-URBANA
634.06IL C005
TRANSACTIONS OF THE ILLINOIS STATE HORTI
39 1895
3 0112 017676450